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# REVIEW of EDUCATIONAL RESEARCH

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## SCHOOL ORGANIZATION

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# REVIEW OF EDUCATIONAL RESEARCH

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## SCHOOL ORGANIZATION

Prepared by the Committee on School Organization:  
PAUL T. RANKIN, W. C. REAVIS, and W. W. COXE, *Chairman*.

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## FOREWORD

SCHOOL organization is one of the parts of school administration which is gradually being subjected to the criticism and examination of scientific investigation. Administrative procedure has not been evaluated by scientific methods so extensively as has teaching procedure, because, apparently, evaluation is more difficult in the one case than in the other. This may be because the results are more difficult to measure or because they follow less immediately on differences in procedure. The summaries contained in this number of the *Review* indicate, however, that a very respectable beginning in the scientific study of school organization has already been made.

The first section of the *Review* is a historical sketch of the development of school organization from the district school to the modern city school organization. The second section reviews the attempts to evaluate scientifically the external forms of organization, such as the 8-4, 7-4, and 6-3-3 plans, the pre-school, kindergarten, junior high school and junior college, the platoon school, the all-year school and supplementary types of school.

The third part deals with internal forms of organization, such as modes of grading and classification, including homogeneous grouping. The review of the studies on these matters should be of value in guiding the policies of administrators and should point the way to further studies of these problems.

FRANK N. FREEMAN, *Chairman,*  
*Editorial Board, 1931-32.*



## CHAPTER I

### The Development of Public School Organization

THE term, *school organization*, as used in this *Review* refers to the units into which public schools are divided—kindergarten, elementary school, junior high school, senior high school, vocational schools and special classes—to the characteristics of each unit together with the length of time given to it, and to the methods of grouping children for the purposes of instruction, such as grading and promotion policies. There are thus eliminated from consideration all topics related to administrative organization and control.

#### Introduction

*Social and industrial influences upon school organization*—We may think of three periods in the history of our country, each of which produced schools which were distinctive with respect to their organization (28:186). An understanding of their organization is aided by an understanding of the social and industrial movements of these periods. The three periods may be designated as follows: (a) first period of centralization of population (from first settlement to the beginning of the eighteenth century); (b) period of decentralization of population (from the beginning of the eighteenth century to the beginning of the nineteenth century); (c) second period of centralization of population (from the beginning of the nineteenth century to the present date).

These dates apply to Massachusetts. In other parts of the country similar periods are found, but in general with later dates. Because these periods came earlier in Massachusetts this state exercised pre-eminent leadership in many phases of education. We can, therefore, look to Massachusetts conditions to explain the beginnings of much of our school organization.

During the first period, the necessity of a compact settlement for protection from the Indians, mutual dependence for food and clothing, and strong religious feelings made centralization of population not only natural but necessary (57:84-85, 94-95; 28:74).

Beginning with the eighteenth century (second period), families began to settle in distant communities. This dispersion was caused by the following factors: (a) the desire for greater independence in exercising property rights; (b) the weakening of religious feeling, and the growth of dissension; (c) stories told by dissenters in England; (d) the witchcraft illusion; (e) attractiveness of vast quantities of raw land; and (f) little need for building up manufactures (28:71-73; 57:95-106). The dispersion of

population raised problems of government which had not previously existed. Furthermore, it was accompanied by decreased intellectual activity which showed itself, among other ways, in a decline of interest in education.

In the early part of the nineteenth century (third period) conditions favored greater world travel and greater dissemination of knowledge. At about the same time there was a marked increase in the number of inventions and also the beginning of the factory system in the United States. Factories caused a reconcentration of population. The opportunities to make money where trading and manufacturing were carried on increased the number of cities and the means of transportation very rapidly (28:117, 188-89; 30:58-59). All of these forces stimulated intellectual interests which were manifest in a reorganization of education.

*Schools during the first period of centralization*—This period marks the beginning in Massachusetts of the Latin grammar school, of the reading and writing schools, and of the Dame schools (28:186; 57:136-149). The Latin grammar schools prepared for college; the reading and writing schools incorporated two concepts of education. The reading school was a remnant of an aristocratic notion of education, while the writing school marked the beginning of a practical type of education. The reading and writing schools had no relationship to the Latin grammar schools, but were designed for those who did not intend to enter college and the professions (50:365-66). The Latin grammar schools were ungraded and taught a comprehensive course of elementary and secondary education. They required only that pupils be boys and know their A-B-C's (28:58).

*Schools during the period of decentralization*—The establishment of schools comparable to those which had existed during the seventeenth century in communities where the population was widely scattered met with considerable difficulty. Difficulties arose not only because of the thinly distributed population, but because educational interests in general had decreased, and because the colonists who formed the pioneer group generally had little formal education (27:75).

The carrying over to these newer conditions of the Latin grammar school and the reading and writing schools was impossible without modification (57:109). The people had to solve their educational problems in new ways. One was the "moving" school. Instead of holding the school in one place and bringing the children to it, the school was held in several places and went to the children. Thus in Situate (1704) the school was kept in one end of the town a third of the time, in the other end a third, and in the middle the other third of the time. In Sutton (1730) a school "to learn the children to read and write English" was ordered in four places for one month each (28:76; 57:167-70). These schools were influenced chiefly by the English school (reading and writing), but in some places the influence of the Latin grammar school was found. The moving school, which came

into existence in the early part of the eighteenth century, reflected new social and economic conditions and in turn developed into the district school (28:187).

As population dispersed there was a growing desire to form divisions within the town for purposes of establishing schools which were closer to the homes and which could be controlled more directly by the school patrons (33:6).

This tendency was in keeping with the growth of democratic ideas during this period and the desire for local self-government. This type of organization fitted in so well with current thinking that it became characteristic not only of sparsely settled communities but of cities as well (49:220) and was rapidly transplanted from Massachusetts to other New England states and by way of New York to western states (59:25).

These schools continued well into the period of centralization but about 1830 began to receive severe criticism on the part of educational leaders. We find in the reports of Horace Mann, John A. Dix, and other state superintendents, repeated enumeration of the defects of the district system (9:319; 34:5; 8:69; 54:131). In spite of these reports the system continued to flourish, for it met certain requirements of the citizens which were closely related to their ideas of a democratic government. At the same time the impossibility of carrying forward desirable types of instruction in schools which were small and in which the difficulties of classifying children were great, was pointed out again and again by educators (59:23, 25, 26; 37:12; 62:27; 43:x; 40:36; 44:viii).

Academies had their beginning during this period because they met the demand for a more practical type of training than the Latin grammar schools offered, and because they offered advanced training for the group which did not intend to go to college. They were founded on private initiative but frequently given public support. Their relation to the common school was often a parallel one, similar to the relationship between the old Latin grammar school and the reading and writing school (28:118-19). During the next period a serial relationship was established (22:52; 30:12).

*Schools during the second period of centralization*—The change in school organization, which was characteristic of this period, was toward a single unitary system in which the parts are related to each other. Several influences brought this about: (a) the political ideas which had been developing were naturally in opposition to such class distinctions as had existed when there were two parallel systems of education; (b) the development of larger centers of population forced the building of larger schools and gave rise to new problems in organization; (c) the increased political power of the middle and lower classes gave rise to a demand for a more practical type of education; and (d) larger numbers of children were attracted to school for longer periods of time. The effect of all this

was a popular demand for a greater integration of the school units and extension of school opportunities.

As the history of school organization during this period is more closely related to our present forms of organization than that of previous periods, it is necessary to consider some of the influences and suggestions for changes more in detail. For ease of presentation the history will be traced under two separate topics: (a) development of units in the school organization, and (b) the development of grades in the school organization.

### **Development of Units in the School Organization**

*Introduction*—We have noted on preceding pages that school units during colonial times had a parallel relationship. The different units were designed for different classes of society and there was no such thing as promotion from one unit to another. This type of organization was similar to that which had existed in England and on the Continent.

Following the establishment of such units we find two kinds of development going on: (a) The units tended to restrict rather definitely the subjectmatter which they taught. For example, we find that the Latin grammar school and the reading and writing school gradually set up certain requirements for admission. We find that Harvard College developed more definite entrance requirements for which the Latin grammar school prepared. (b) Even where the units were parallel there was thus a certain demand for a serial relationship. The demand for serial relationship became more prominent during the time when the district system developed. As we have noted, the district system gave rise to the common school and subsequently to the high school. The current ideas of democracy favored a single school system for all children.

*Increase in number of units*—As one traces the development of the school system in various cities and towns, one notes that as communities grew in size there was a tendency to increase the number of units. One or two examples will make this clear. In Providence, Rhode Island, free schools were established in 1800. They were ungraded. In 1827 a primary school was introduced and pupils were promoted from it to the writing school. In 1843 a higher school was organized (15:636).

In Worcester, Massachusetts, in 1830, we find the following schools established: infant schools, age of admission three years; primary schools, for graduates from the infant schools; second female schools and English school for boys, for pupils promoted from the primary schools; female high school, for girls promoted from the second female schools; Latin grammar school for boys promoted from the English school. The infant school was added in 1830; the other schools had been in existence before. At the same time a winter school for boys was opened (25:423).

In Lowell, Massachusetts, in 1835, there were primary schools for children below seven, grammar schools for children above seven, and high schools.

In some places the intermediate school was added after the establishment of the elementary and grammar school. In other places the grammar school became the latest addition.

*Variability in definition of units*—Considerable variation is found with regard to names applied to these various units. We find the terms *primary*, *elementary*, *intermediate*, *grammar*, and *high*, used oftentimes with overlapping meanings. Sometimes the primary schools included two, three, or four years' work; sometimes the intermediate schools were one, two, or three years in length. The term *high school* also seems to have had a great variety of meanings: in Cleveland in 1866, it was a school between the primary and intermediate (5:445); in Dubuque, Iowa, at about the same time it was a school between the primary and the grammar (5:457).

*Supplementary schools*—As early as the third decade of the nineteenth century certain types of supplementary schools came into existence. For example, the first evening school was probably begun in New York City in 1833 (14:252). In 1838 Henry Barnard in his proposed gradation of public schools suggested supplementary schools for the purpose of supplying "deficiencies in the education of individuals whose school attendance has been prematurely abridged,—and to carry forward as far and as long as is practicable into future life the training and attainments commenced in childhood" (4:463). The kindergarten was introduced originally as a supplementary school and later became an integral part of the school system. Other schools such as the nursery school, continuation school, and trade school may also be thought of as supplementary schools (45:427; 14:252, 319; 28:255; 48:32, 35, 37; 5:439; 35:105-7).

The main purpose of these schools seems to have been to care for deficiencies of the established system or to care for special needs.

*Upward extension of education at public expense*—Some of the units above mentioned were added because of a popular demand for a longer period of education. One of the most notable of these upward extensions is to be found in provision for colleges and universities at public expense, an expression of which are the land-grant institutions. Through these institutions the people expected to provide for advanced training for others than those who were to enter the learned professions. Impetus to this came about through the ordinance for the government of the Northwest Territory. The actual establishment of these institutions, however, was not made possible until the Morrill Act in 1862 (56:1-3).

A still more recent development is the establishment of junior colleges.

*Summary*—As we trace the development of units into a closely integrated system, it is to be noted that expression is given to the democratic idea that a single school system, open to all children, should be established.



In the second place, the existence of different units expresses a popular idea that efficiency would be gained through specialization—each unit being responsible for a definite section of the course of study, setting its requirements for admission and its requirements for graduation.

### Development of Grades in the School Organization

*Definition*—According to the present use of the word *grade*, we mean a year of school work. It thus signifies a level of accomplishment and we find, even in the beginning of grading, the term *grade of attainments* thus used (4:555).

*Forces developing a grade organization*—The idea of levels of accomplishment as a basis for organization is very old. In various educational systems which developed, both in Europe and in America, preceding the nineteenth century, this idea was frequently found. Thus it becomes impossible to assign any date to the origin of this idea which is fundamental to the grade system. We can say, however, with fair assurance, that a system which was based almost entirely upon this idea was developed for the first time in the United States about 1850 (50:367).

There is an apparent difference of opinion concerning the source of our graded system, some (as Monroe, 31 and 32) claiming that it is a purely American product and others (as Judd, 26 and 27) claiming that it was carried over bodily from Prussia. There can be no doubt that both points of view are extreme. The units which developed with the growth of population are closely related in certain respects to what we now think of as grades. Each one had a definite portion of the subjectmatter to teach; each one had certain definite entrance standards and certain definite promotion standards. Length of time, however, in a unit might vary anywhere from one to three or four years. The essential contribution which seems to have been made by the Prussian system is that of one teacher to a grade, one class to a room, and restricted, required subjectmatter (12:293-4). It would thus appear that American education, at the time of the Prussian influence, was already partially organized into grades, and was therefore in a receptive position to make use of these newer ideas (25:417-24).

The factory system, introduced in the early part of the nineteenth century and characterized by specialization of work, proved so successful that it was applied to education. Teachers began to specialize in certain parts of the curriculum; for example, the subjectmatter which should be taught in one year to a group of pupils with a narrow age-range; and a superintendent was appointed to supervise the teachers and integrate their work (11:230). These groups of pupils studying specified amounts of subjectmatter were identified as grades.

The trend already noted to abandon a parallel relationship of units for a serial arrangement, the increasing demand for school opportunity for all



children, the larger enrolments, and the growing demand that public schools be supported by public taxation, were social forces bringing about the rapid development of the graded system.

The monitorial schools which were introduced into this country about 1806 were influential. They helped to make education popular by demonstrating the possibilities of mass instruction. Their organization placed children of equal attainments together (22:51).

One of the strongest influences to hasten the development and spread of a grade organization was the growth of cities with the multiplication and classification of separate schools.

Still another influence was the creation of the new position of city superintendent of schools in 1837 (50:358). The superintendency resulted, gradually, in the consolidation of school districts within a city and the introduction of more systematic classification and of definite promotion policies. Administrative considerations were influential. With a system of grades, transfers of pupils from school to school were easier, and it was easier for the superintendent to center responsibility for the quality of the teaching.

*Growth of grade organization*—Horace Mann and Henry Barnard urged widespread grading of schools between 1820 and 1850 (4:458; 50:200; 28:191).

There seems to be general agreement that the Quincy School, opened in Boston in 1848, with John D. Philbrick as principal, was the first graded elementary school of the United States. It had twelve classrooms and twelve teachers (50:367).

About the middle of the nineteenth century state departments of education grew rapidly, and in the years from 1850 to 1860 various state superintendents of public instruction urged the organization of grades upon the local school authorities (50:375; 63:507; 4:555).

In 1869 Mr. Barnard made a nationwide survey of educational progress. It was obvious that at this time grade organization was general throughout the country (50:383).

The development of examinations parallels grade development. We find Horace Mann, in 1840, advocating examinations as a basis for promotion from one grade to another (10:53). The first written examination to classify pupils was given in 1845 in Boston (28:192-93). For the next ten years examinations were strongly urged, but by 1858 evils began to appear (47:23). Discussion continued and modifications were made, and by 1890 examinations as a sole means of promotion, at least in the elementary school, were generally abolished (48:143-44; 36:655, 679; 38:574; 39:470-71; 41:583; 42:686).

*Variations in grade organization*—The variations found from place to place are largely in the ways in which grades were grouped into units. It

is probable that there were also variations in practice with regard to the meaning of a particular grade (13). It is to be noted that nothing in the nature of these variations indicates any disagreement with the fundamental principle of a graded system (5:105, 127; 38:600; 6:81).

*Criticisms of the grade organization*—The graded system had hardly been well established throughout the country before it became the subject of serious criticism. These criticisms may be summarized as follows:

1. It assumes uniformity of ability for all children (61:255).
2. It assumes uniformly good teaching throughout the school (61:255).
3. It forces uniformity of attainment upon every child ("intellectual lock-step"; "Procrustean bed") (61:254).
4. It produces pressure and over-tension, particularly with the bright pupil (51:399-400).
5. A pupil who fails is obliged to repeat an entire year's work, often attended by humiliation, discouragement, and loss of ambition (3:331; 55:602).
6. Efforts to promote at any time have proved unsuccessful (14:24, 46).
7. The tendency of the graded system is to hold back the bright child (21:360).
8. The course of study is usually made to fit the child of average ability, thus failing to make provision for the bright or the dull child (21:360).
9. The teachers in a graded system tend to become isolated, independent factors of the system of which they are a part (16:253).
10. The graded system, although practical in cities and towns, is impracticable in villages and rural districts (2:526).

Criticisms were not entirely negative. Harris enumerated the following advantages of the grade organization:

1. Great increase in the length of recitation.
2. Far more thoroughness in the discussion of the lesson, sifting the different statements and probing the meaning of the same.
3. Great stimulation of the mental activity of the pupil through trial and competition with other members of his class (23:266).

### **Suggested Modifications in Grade Organization**

*Experimental reorganization*—It has been noted that the grade system became subject to criticism about 1870. Quite naturally these criticisms resulted finally in attempts to find a remedy. Several suggestions were widely discussed and were tried in many places throughout the United States. The various suggestions need to be reviewed in order that one may discover the ways in which attempts were made to remedy the evils of the grade system. Many of them imply new principles of grouping children, but they were proposed as a modification of, and not a substitute for, the grade system.

One of the first suggestions, to modify the grade organization in such a way that varying abilities might be cared for, was that proposed by Dr. Harris (1870) in Saint Louis. He divided the year into intervals of ten weeks, promotion taking place at any time. By this system it was not necessary for a child who failed to repeat the work of a whole year, nor was it

necessary for the child who was capable of an extra promotion to skip a whole grade (23:267).

The Elizabeth plan was developed by W. J. Shearer in 1886. Within each grade were organized several groups based upon attainment levels of the pupils and reorganized from time to time. This adjustment did not modify in any way the promotion and classification plans but provided flexible groupings to improve the effectiveness of teaching (52:59-75).

The modification developed in Cambridge, Massachusetts, about 1895, provided for several rates of progress through the grades. It seems to have been prompted by President Eliot (18:384).

In the same year (1895) North Denver effected a modification involving an entirely different principle. Instead of allowing bright pupils to progress more rapidly, they were encouraged to do extra work, thereby enriching their curriculum (60:10).

A few years later several places introduced what we might characterize as coaching plans. In Batavia, in 1898, John Kennedy provided two teachers to a room, one of whom was to do individual work with the children (46:46). At about the same time Pueblo introduced a similar plan (60:15). In 1904 Newton, Massachusetts, introduced the coaching teacher as well as more flexible promotion (60:14-15).

Another type of effort to overcome the deficiencies of the grade organization is to be found in individualized instruction. This plan naturally grew out of the coaching teacher idea and in some respects is easily and inevitably confused with it. Superintendent P. W. Search who is credited with the Pueblo plan was an advocate of individualized instruction. The idea was put into operation by Frederic Burk in 1913 and became definitely known as "individualized instruction" (7:327-30). Further development was made by Superintendent Washburne at Winnetka (58:14-25). The Dalton plan as put into operation in Dalton, Massachusetts, and elsewhere, is essentially individualized instruction, but places the emphasis in a somewhat different fashion than the Winnetka plan (1:162). Individualized instruction was given further impetus by the preparation of practice tests as devised by S. A. Courtis in 1912.

The Gary or Platoon or Work-Study-Play plan was suggested in order to afford an organization which would facilitate carrying out in practice the newer ideals of progressive education (17:175-76). It was an attempt to provide a greater opportunity for all-round development than was possible under the older organization. It was first put into operation in Gary and later was experimented with in Kalamazoo and Detroit. The experiments proved satisfactory and during the period of building shortage of 1921 it was officially adopted as the plan of school organization in Detroit. Although it provides for better adjustment of school work to pupil needs, it does not involve any fundamental modification in the grade organization (53:40-100).

The use of standardized tests in recent years has made evident the wide variation of ability and achievement in each grade. These new facts led naturally to attempts to form homogeneous groups within the grade. This procedure is another attempt to overcome the evils of the grade organization.

*Economy of time in education*—The impetus of extended discussion of a reorganization which would economize time came from President Eliot. It was taken up by President Butler of Columbia, Dr. Judd of Chicago, and others (24:159). The suggestion for shortening the school period was either that one grade might be dropped, or that subjects in certain grades might be omitted and others of a more advanced nature introduced. In either instance it was hoped that students would complete their schooling a year earlier (20:617-18).

The length of the school year has increased markedly even within the past fifty years. This development necessarily raised the question of the nature of the additional material which should be taught and of the possibility of shortening the period devoted to certain school units.

The issue also involves summer schools in which pupils are able to make up for failures and to gain a grade, and all-year schools in which the summer vacation is completely eliminated (19:326-29).

*Scientific study of school organization*—Our present school organization can thus be explained as the result of social and economic forces. It does not appear to have been studied in a scientific manner through the course of its development. The scientific literature of the subject is confined to certain phases of present day practice—the value of certain units and suggestions for ability grouping.

## CHAPTER II

### Evaluation of the Various Units of the Public School System

THE early attempts to evaluate the various units of the public school system were chiefly qualitative in character. Educational leaders, such as Charles W. Eliot (67:151-76), Nicholas Murray Butler (65), James H. Baker (64:507-26), and William Rainey Harper (69), criticised the organization of the public school system during the last decade of the nineteenth century and the first decade of the twentieth century and urged that changes be made. Their criticisms were reflected in committee reports (72), which were influential in paving the way for many experiments in educational reorganization and in stimulating quantitative studies designed to evaluate the traditional organization of the public school system and the modifications made in the organization of its various units resulting from experimentation.

#### The Kindergarten

*The status of the kindergarten as a unit of the public school system—*The kindergarten was first established as a unit of the public school system in 1873 in Saint Louis, Missouri. It has enjoyed a steady growth, although it is still not generally accepted as an integral part of the public school system, except in cities. The total enrolment in public school kindergartens in 1927-28 was 695,490, or 2.74 percent of the total enrolment in elementary and secondary schools (80:16).

The age at which kindergarten training begins varies from 4½ to 6 years. The public school system with a kindergarten unit thus accepts responsibility for the formal education of children at an earlier age than systems without kindergartens. The establishment of a kindergarten therefore increases the cost of public education, a fact which warrants inquiry into the value of kindergarten training to the child.

*Early appraisals of the kindergarten were qualitative—*Strong claims have been frequently made in support of kindergartens. Irrespective of their validity, such appraisals possess little value when school budgets are sharply scrutinized. Quantitative appraisals are therefore essential, if the kindergarten as a unit of the public school system is to grow or to be defended successfully when budget items pertaining to kindergartens are questioned.

*Quantitative investigations of kindergartens—*A considerable number of factual studies of the value of kindergartens have been made within recent

years. The findings as a whole have been disappointing to the proponents of kindergartens, who may claim that the studies in question have failed to evaluate the true worth of kindergarten training to the child. Whatever the weaknesses of the factual studies, they are at least superior to mere opinion, and even if open to criticism, they may point the way to subsequent studies of greater value.

*The influence of kindergarten attendance on promotion or failure in the first grade*—Campbell (66:17) in a study of 547 children in Detroit who had attended kindergarten and 215 who had not attended kindergarten found that the effect of kindergarten training on promotion in Grade 1B was very slight, being only 8 percent for each period of five months of kindergarten training. When the data were arranged according to the ages of the children at the date of leaving the kindergarten, the findings show a decrease in promotion rate for children kept in kindergarten after the age of six.

*The influence of kindergarten attendance on age-grade progress*—A study by Rankin (77) in Detroit of 546 sixth-grade pupils, 228 of whom had attended kindergarten, showed very little, if any, effect of kindergarten training on the rate of progress through the first six grades. His data confirmed the findings of Campbell with respect to diminishing returns in subsequent school progress from extended attendance in the kindergarten, showing that children with two terms of attendance in kindergarten require more time to complete the six elementary school grades than children with one term of attendance or no attendance in kindergarten. His study also revealed that there were no consistent differences in the rate of progress between groups of children entering Grade 1B at different ages, the length of kindergarten attendance being held constant. The children who entered school at an early age tended to retain their initial acceleration.

Greer (68) virtually duplicated the study of Rankin with 421 sixth-grade pupils, selected from ten elementary schools in Detroit. Her findings varied from those of Rankin in that the children without kindergarten training were found to have gained fewer half-grades than those with one term in the kindergarten, and those with one term in the kindergarten fewer grades than those with two terms. While her data show that attendance in the kindergarten reduced the time required to complete the work of the first six grades, the time lost on the part of those without kindergarten training was more than offset when compared with the time spent in kindergarten attendance by the kindergarten groups.

The studies of both Rankin and Greer should be considered inconclusive on account of unsatisfactory samplings. However, in spite of their apparent contradictions, both studies confirm the fact that the kindergarten does not materially shorten the subsequent school life of the child.

*The relation between kindergarten attendance and the rate of progress through grades two to eight*—An extensive study involving 24,775 pupils



in grades two to eight was made in 1924 by the Research Bureau of Minneapolis (71:16) to determine the influence of kindergarten attendance on failure and grade skipping. Virtually no effect was found, except in the cases of pupils who had attended kindergarten at least 120 days. Such pupils experienced slightly less failures but gained less from skipping than the pupils without kindergarten attendance. If the time spent in kindergarten is deducted from the total attendance, the non-kindergarten group has the advantage in time spent in school.

*The rate of progress of kindergarten and non-kindergarten children through the grades and high school*—In a study of 329 pupils in grades one to eight—117 had not attended kindergarten and 212 had attended kindergarten—Robinson (78) found that in the non-kindergarten group 7.7 percent were accelerated and 34.2 percent were retarded, while in the kindergarten group 6.6 percent were accelerated and 21.7 percent were retarded. He further found that in a group of 77 pupils in grades nine to twelve—30 had not attended kindergarten and 47 had attended kindergarten—30 percent of the former were accelerated and 21 percent of the latter. Only 6.7 per cent of the non-kindergarten group were retarded whereas 17 percent of the kindergarten group were retarded.

Robinson's data were collected in a small school system which maintains a kindergarten, but which also receives a considerable number of pupils by transfer from neighboring communities. His findings show that the elementary-school group gained very slightly in rate of progress from kindergarten attendance and that the high-school group lost both in acceleration and retardation from kindergarten attendance.

*The effect of kindergarten attendance on the progress and quality of work in the first three grades*—A very comprehensive study of the effect of kindergarten attendance upon progress and quality of work in the first three grades was made by a committee in Detroit under the direction of Rankin in 1923-25 (76). The study is based on 6,318 matched cases: 2,106 had not attended kindergarten, 2,106 had attended kindergarten one term, and 2,106 had attended kindergarten two terms. The findings are positive in character, but are not very consoling to those who have made strong claims in behalf of kindergarten. The difference in average mark per subject is only two-hundredths points in favor of the pupils who have attended kindergarten. The amount of progress made as a result of attendance in kindergartens was one-sixth of a term, or approximately 17 days. This amount was unchanged by two terms of attendance in the kindergarten. The most significant finding of the investigation is the light thrown on the type of pupil who really profits from attendance in the type of kindergarten in operation in Detroit at the time of the study. The study showed that the children of average ability profited more from their contacts with the kindergarten than those classified as low or superior in ability; that children who entered the first grade young profited more than those of normal

age and those who were considered old for the grade; that those who come from good home environments received greater benefit than those from medium or poor homes; and that those with a good command of English profited more than those with poor or medium language control.

A similar investigation by McLatchy (70) in which pupils in the first three grades were studied with respect to the influence of the kindergarten on progress in the primary grades showed that children who had attended kindergarten were on the average two-tenths of a year older chronologically but that the mean mental age was six-tenths of a year higher than for those who had not attended kindergarten. Peters (75), however, in a study of 374 kindergarten and non-kindergarten children above the fifth grade in the elementary schools of Berkeley and Oakland, California, who were paired according to intelligence, found that the non-kindergarten pupils were younger by 3.4 months. His study also showed that the kindergarten group both failed and skipped fewer grades than the non-kindergarten group, but the net gain for the two groups was exactly the same. A comparison of the marks received by the pupils of the two groups in scholarship and deportment showed that the non-kindergarten group made slightly more excellent marks and also slightly more poor marks in both scholarship and deportment than the pupils who had attended kindergarten.

*Progress in new type kindergartens*—A significant departure in kindergarten organization has been made in New York City with a reported gain in results (74:401). Kindergarten extension classes or informally organized first-grade classes are formed with the work a step in advance of the regular kindergarten for pupils approximately six years of age. A study of the age-grade progress of fourth-grade pupils who had passed through these extension classes showed that the children with both kindergarten and kindergarten extension work made better progress than those having kindergarten training only and that both groups made better progress than those who entered school in the first grade.

*Pre-kindergarten institutions*—The necessity of rendering temporary guardianship and nursery care to children below kindergarten age, who, while remaining a part of the family unit, are deprived of parental care during the day, has brought into being a number of institutions both public and private. The term most generally applied to institutions of the type is *day nursery*. In addition to the general care provided for these children of preschool age through the nurseries, types of appropriate education are offered and older children of the family who would otherwise be deprived of school to care for the younger children are insured regular attendance in school.

Data reported for 1928 indicate that there were approximately 600 regularly-organized day nurseries in the United States (73:91). Of this number 121 were classified as nursery schools but only four of these were supported by the school systems (79:11). At present, the inclusion of nursery schools

and day nurseries in the elementary school unit is advocated by few people. The present tendency is to regard the nursery school primarily as a laboratory for the training of parents and pupils of secondary-school age.

*Summary*—The studies of the value of the kindergarten have been based on the measurement of academic advancement. They do not indicate that kindergarten pupils advance more rapidly than do others. Whether the time spent in kindergarten can be justified by a type or degree of socialization, which pupils do not secure from their later experience in school, is a question which must be settled by a different sort of measurement than has thus far been applied.

### **The Elementary-School Unit**

For many years the length of the elementary-school unit has been a topic of educational discussion. Since 1840, the date of the general introduction of grading in the elementary school, the period of elementary education in the United States has been fixed very generally at eight years. Prior to the introduction of grading, the length of the elementary school period was usually determined by circumstances, such as the ability of the teacher to offer instruction beyond the rudiments, the distance of the school from the homes of the pupils, and the economic status of the district. During the colonial period the amount of free schooling received by an individual was usually small. It has been estimated that the aggregate days of schooling received by the average American citizen in 1800 was about 80 days. By 1840 the average had increased to 208 days. Since that date the average increase in average days of schooling of American citizens has been approximately 130 days for each succeeding decade (88:9).

Many school systems in the southern states and a few in the northern states had adopted a seven grade system for the elementary-school unit. Among the outstanding examples of this practice was Kansas City, Missouri, which organized its elementary schools on the seven-year basis in 1867. The discussion of educational reorganization precipitated by the vigorous report of the Committee of Ten in 1893 directed attention to those school systems which had shortened the elementary-school unit. Superintendent Greenwood of Kansas City collected data, which he presented at the meeting of the National Education Association in 1903, to show that the pupils of his school system had not suffered any measurable educational loss as a result of the abridgement of the elementary unit. He showed that 85 percent of the pupils in the Kansas City Schools graduated from the elementary school course and that a larger percentage of the pupils entered the high schools of the city than any other city of the same or larger size in the country. These facts he attributed largely to the seven-year course (83:247-63).

The strong position taken by the Committee of Ten regarding the reorganization of the elementary- and secondary-school units and the subsequent discussions at meetings of the National Education Association resulted in many experiments in reorganization following 1910. The development of the testing movement and the improvement of school records encouraged objective evaluations of the reorganization experiments with the result that a considerable body of evidence on the length of the elementary-school unit is now available.

*Report of the Commission on Length of Elementary Education*—Without doubt the most comprehensive scientific study on the length of the elementary-school unit is that carried on in 1925 by a sub-committee of the Educational Research Committee of the Commonwealth Fund, designated as the Commission on Length of Elementary Education (85). The Commission secured the cooperation of 610 school systems in the United States and Canada organized according to the seven-year and the eight-year plans. The investigation consisted of three parts:

I. An intensive study was made of six counties in Maryland, three having the seven-year plan and three the eight-year plan. The counties selected were paired, with length of period being the factor of difference.

II. Superior city school systems were investigated, (a) intensively by means of tests in the seventh and eighth grades of three seven-year systems and five eight-year systems, and (b) extensively by studies of cumulative record cards in 139 school systems involving 29,029 pupils, to determine the average time required to complete the elementary-school course.

III. Information as to age-grade status and retardation was gathered from two Canadian school systems which had changed from the eight-grade to the seven-grade plan a few years previously.

In brief, the findings of the investigation warrant the conclusions that elementary education of a satisfactory degree of richness of content can be provided in seven grades, that pupils can be educated through a seven-grade curriculum to a point where they can efficiently pursue high-school work, that the curriculum, which, strictly speaking, may be called elementary, is very generally completed at the end of the sixth grade, and that strong internal influences are at work which tend to merge the seventh and eighth grades irrespective of plan of organization with the high-school or secondary-school unit.

*Shortening of elementary-school unit without loss in efficiency*—Shouse (91) has compared the gain in time with the achievement attained by the graduates of the seven-grade elementary schools of Kansas City with the eight-grade schools. He found that the pupils of the seven-grade schools saved on the average eighty-three hundredths of a year without any sacrifice in efficiency, the seven-grade graduates ranking on par with the eight-grade graduates on standardized achievement tests and receiving subject marks both in high school and college of similar grade.

In a study of the progress of 389 pupils who were allowed to advance at the rate at which they desired to progress during a period of two years,

Washburne (98:170-72) found that 50 percent of the pupils saved time, 30 percent neither gained nor lost time, and 20 percent lost time. The 187 pupils who saved time through individual work gained a total of 655 months in the two years, or an average of 1.75 months per year for each pupil. The greatest single saving was 15 months, an accomplishment of three and one-half grades of work in the two years. The 76 pupils who required more than two years to complete the work of the two grades, lost a total of 220 months, or an average of 1.45 months per year per pupil. Washburne concludes that since these pupils did not have to repeat the work as a result of non-promotion, a time saving was actually effected for them as individuals through the operation of a system of individual instruction. The achievement of the pupils was held as a constant factor in this study and the time of completing the work of the grade was the variable. If Washburne's group of pupils constitutes a fair sampling, his study points clearly to the fact that the prevailing practice of year-to-the-grade organization works a great injustice to approximately half of the pupils, who are evidently not challenged by the amount of work required in the grades.

The findings of Washburne are corroborated by a similar investigation carried on at the San Francisco State Teachers College with pupils who graduated from the elementary grades of the training school (97:168-70). Of 130 pupils who graduated, 100 completed the course in less than eight years, 7 in eight years, and 23 required more than eight years. The saving in time in one case was three years.

Additional evidence of the ability of pupils to finish the eight-grade course in fewer than eight years is furnished by Sutherland (93:176) in a study of progress in the adjustment rooms in the elementary schools of Los Angeles where individual instruction is also used. He found that the development of abilities in assigned work for misfit pupils proceeded 3.36 times as fast as they were assumed to develop and were permitted to develop in the regular classrooms.

*Pupils in seven-grade and eight-grade systems compared*—A comparison of the scores made on standardized tests in arithmetic, writing, spelling, and oral reading by the pupils in the seven-grade elementary unit of Bristol, Connecticut, showed that the eight-grade standards can be attained by the end of the seventh grade without resorting to retardation or late entrance (90).

Mayfield (87) compared the progress made by 478 pupils in the University of Chicago High School who had entered the freshman class from the seven-grade University Elementary School with that made by 711 pupils who entered from regular eight-grade schools. He found that the two groups were approximately equal in intelligence quotients, but that a greater proportion of the seven-grade pupils came from homes of the professional classes. The seven-grade pupils graduated younger, received a slightly higher percentage of superior marks, and a larger percentage



of them completed the high-school course. He concluded that the shorter course of the University Elementary School not only saved time for the pupils but also fitted them to carry high-school work as successfully as the graduates of eight-year schools.

Traxler (95) refined some of the data examined by Mayfield and arrived at slightly different conclusions. He tabulated the mean age of graduation from high school of 451 seven-grade pupils and 613 eight-grade pupils deriving the results exhibited in Table 1. A considerable range of differences in the mean age of the different classes constituting the two groups at time of graduation was found, the lowest being 1.5 months for the senior class of 1923 and the greatest 8.2 months for the senior class of 1919. The mean for the thirteen class groups is 4.4 months, or approximately one semester of school time. In every class the eight-grade pupils exceeded the seven-grade pupils in average age.

Traxler studied the marks received by the two groups of pupils throughout their high-school courses. During the period 1918 to 1930, three different systems of marking were employed in the University of Chicago High School. Of the nine comparisons made the seven-grade group excelled the eight-grade group in six. Although the difference in the ratings of the two groups was found to be small, Traxler concluded that it was too large to be explained by the slight difference found to exist between the two groups in intelligence quotients, and that the results showed a slight advantage in high-school achievement for the seven-grade group.

Traxler next divided the eight-grade group of the senior classes of 1927-30 on the basis of whether the pupils had skipped semesters or grades or had spent the full eight years in the elementary school. He found that pupils of the eight-grade group who had skipped semesters or grades excelled the

TABLE 1—MEAN AGE OF GRADUATION FROM HIGH SCHOOL OF SEVEN-YEAR AND EIGHT-YEAR ELEMENTARY-SCHOOL GRADUATES\*

Graduating class	7-grade group		8-grade group		Difference
	No. of pupils	Age in months	No. of pupils	Age in months	
1918.....	34	207.4	39	214.6	7.2
1919.....	27	202.6	33	210.8	8.2
1920.....	29	206.2	32	212.5	6.3
1921.....	33	205.9	54	211.1	5.2
1922.....	23	206.3	50	211.0	4.7
1923.....	27	205.6	60	207.1	1.5
1924.....	36	207.4	33	213.1	5.7
1925.....	38	207.2	56	211.2	4.0
1926.....	40	207.0	51	211.0	3.8
1927.....	45	208.4	60	212.1	3.7
1928.....	37	207.6	33	210.4	2.8
1929.....	50	207.6	55	211.5	3.9
1930.....	32	206.6	57	210.6	4.0
1918-30.....	451	206.8	613	211.2	4.4

\* Data taken from Traxler (95).



seven-grade group in intelligence quotient by 1.8 points and the eight-grade regulars by 3.7 points. In age at graduation from high school the eight-grade pupils who had skipped grades were three-tenths of a month younger than the seven-grade pupils and 8.4 months younger than the eight-grade regulars. Likewise in school marks the accelerated eight-grade pupils excelled both the seven-grade pupils and the regular eight-grade pupils. Since a considerable number of regular eight-grade pupils compared in intelligence quotients with the best of the seven-grade and accelerated eight-grade pupils, Traxler raised the question of the effect on pupils of being required to proceed at a pace slower than was warranted by ability.

Jones and McCall (84) found in Richmond, Virginia, that with the single exception of one subject in the senior high school, the accelerated pupils excelled the other pupils in their course marks in elementary, junior high, and senior high school, even though they had saved two terms on the average during the elementary-school period. Engle (82) likewise found in a study of the marks of seniors in the high school at Michigan City, Indiana, who had been accelerated in the elementary school through double promotions, that in comparison with the entire senior class and an equal number of pupils selected at random from the total enrolment of the high school, the accelerated pupils earned on the average five-tenths more grade points and made both a higher percentage of high marks and a lower percentage of low marks than either of the other groups.

*The influence of grade acceleration on progress in college*—Light (86) in a study of the work done at the University of Chicago by students whose elementary schooling had been received in school in southern cities with seven-grade elementary units and by students from states having the eight-grade system found that while the high-school marks of the seven-grade group were slightly lower than those of the eight-grade group, the products of the seven-grade systems actually made better college records than the products of the eight-grade systems.

Dewey (81) studied the records of 431 graduates of the University of Chicago High School as freshmen in the University of Chicago. One hundred eighty-six of the group came from the University Elementary School (seven-grade) and 245 from schools having eight grades. The average grade points of the seven-grade group was 3.02 while that of the eight-grade group was only 2.69. The students came from 12 classes in the University of Chicago High School, 1918 to 1929. When each class was divided according to elementary-school origin, it was found that in ten of the classes the seven-grade pupils excelled the eight-grade pupils. It should be noted that the two groups of pupils had practically the same intelligence rating, yet as university freshmen the seven-grade group received 12 percent more high marks and 9.7 percent fewer low marks than the eight-grade group.

*Internal reorganization of elementary schools*—Elementary schools vary markedly in their internal organization. The assignment of a single grade to a teacher is still the most common practice in classroom organization, although departmental organization has been introduced extensively in the middle and upper grades. The platoon school probably represents the greatest departure yet made in the internal reorganization of elementary schools. It was introduced at Gary, Indiana, by William Wirt in 1908, and is now in use in 850 schools in 154 cities in 38 states (96:20). The plan incorporates departmental organization with a broader and richer program of studies nicely balanced between the regular school subjects and special subjects and activities. The classes alternate so that one-half of the day is spent by each class or division in the regular classroom on regular academic work under the regular teacher, and the other half of the day is spent under various special teachers in the auditorium, gymnasium, shops, laboratories, library, music room, drawing room, or on the playground.

Spain (92) estimated that the platoon plan would permit an increase in pupil enrolment in old buildings of five to 25 percent. In a study of 19 school systems that had adopted the platoon plan, Rogers and Lang (89:287) found that the claims of increased housing capacity ranged from 10 to 70 percent. No adequate evaluation of the platoon plan with respect to instruction has yet been made. Titterington (94:88), however, found in a comparative study of schools organized according to the platoon and traditional plans in Kansas City, Missouri, that the platoon schools excelled in five qualities of citizenship, such as the observance of the safety rule against jaywalking, honesty, application, cheating, selfreliance, trustworthiness, helpfulness, and promptness from 9 to 22 percent. The pupils of the traditional schools excelled those of the platoon schools in only one case.

Certain internal reorganizations have also been undertaken in many of the school systems of the larger cities to provide for children who deviate from the average or normal such as the blind, deaf, crippled, mentally retarded, speech defectives, anemic, and gifted. Special rooms are frequently organized in regular schools in which numbers will permit for these types of pupils, and special schools are developed when segregation seems practicable and desirable. The Report of the White House Conference on Child Health and Protection (99:231-45) sets forth the size of the problem of education for exceptional children and the trends in its development.

*Summary*—The data presented show clearly that the movement to reorganize the elementary-school unit with the idea of shortening the course without impairing its value to the pupils is justified by the facts. The pupils whose elementary education was received in seven-grade schools do fully as well in both high school and college as those whose elementary education was received in eight-grade schools. Unless rapid promotion is

practiced, which seems to be justified by the evidence, the eight-grade school may handicap its pupils through lack of challenge and loss of interest in the work occasioned by needless reviews and repetition, and the establishment of a working pace below the capacity level of the pupils. There is some indication that pupils may be advanced to a higher type of work a year earlier than has been the typical practice in the United States.

### **The Junior High-School Unit**

Since 1910 many school systems have reorganized the seventh and eighth grades of the elementary school and the ninth grade of the high school as an independent three-grade unit of the public school system. This new unit has usually been called the junior high school or intermediate school. Fifteen special purposes have been set forth in the written statements of 59 public school administrators and 20 college specialists since 1920 in support of the reorganization plan (106:20). Some of these purposes have been subjected to special study, and objective data are available for evaluating their merits. Others are supported only by personal experiences and subjective claims.

The rapidity with which the reorganization has spread since 1910 entitles the movement to respect, irrespective of the status of supporting objective data. There are now in continental United States 1127 segregated junior high schools not to mention approximately 2500 other forms of reorganized secondary schools which have resulted from the modification of the traditional eight-year elementary and four-year high-school units (112:150).

The current importance of the junior high-school unit of the public school system is attested by the facts that the Department of Superintendence in 1927 devoted its fifth yearbook to the study of the junior high-school curriculum, and that the same organization in 1929 devoted considerable space in its seventh yearbook (107:117-288) to the consideration of the articulation of this new unit with the six-year elementary school and the senior high school. If the junior high school were only an innovation it would scarcely merit so much consideration at the hands of an organization which, more than any other, is responsible for the form of the various units of the public school system.

*Bridging the gap between elementary and secondary units*—One of the criticisms most frequently voiced against the 8-4 plan has been the break in the continuity of public education created by the faulty articulation of the elementary- and secondary-school units. The traditional attitude of the people toward the elementary unit has been to regard it as a finishing school for the children of the common man; the attitude of the people in the past toward the high-school unit on the contrary has been to regard it chiefly as a college preparatory institution. The failure to integrate these two units has been responsible in no small degree for the large number

of withdrawals from the seventh and eighth grades and the failure of a large number of pupils to enter the secondary schools.

From its inception the junior high-school unit has sought to bridge the gap between the elementary and secondary schools. Proof of its success is offered in the large increases in enrolments in grades seven to nine in school systems that have adopted the plan. Mere increase in enrolment for the grades in question cannot be considered as valid evidence of the success of the junior high school in overcoming the gap between the elementary and secondary schools. Other factors than the junior high school have operated to produce some of the results secured. However, certain data seem to indicate that the purpose has been and is being attained through the introduction of the junior high-school unit.

In a report on the junior high schools of Rochester, New York, in 1925 (110:163), it is shown that prior to the organization of the Washington Junior High School the elementary schools then contributing to this school sent an average of 58.7 percent of their eighth-grade graduates for the five preceding terms to high school. The average for 16 terms after the opening of the Washington Junior High School rose to 86.3 percent, an increase in holding power of 27.6 percent largely attributable to the junior high school. The significance of the increase is enhanced by the fact that a considerable part of the period included in the data for the junior high school coincided with the period of the war marked by increased withdrawals on account of more attractive industrial opportunities both to boys and girls than were available during the period from which the comparative data were drawn. Similar data for the Jefferson Junior High School of Rochester, New York, revealed a gain in holding power for the ninth grade of 14.3 percent (110).

From a study of enrolment data in six cities with population ranging from 40,000 to 200,000, Fritz (102) concluded that the gap which formerly existed between grades 8A and 9B in schools of the 8-4 type had apparently been bridged but that another gap had been created between grades 9A and 10B. Holloway (103), on the other hand, found that urban communities in Kentucky which had adopted the 6-3-3 plan experienced a marked increase in enrolment in grades 7, 8, and 9, much greater than was experienced in grades 1 to 6, or in grades 7, 8, and 9 in the state as a whole, which was organized chiefly according to the 8-4 plan.

One of the most convincing of the numerous reports on increased enrolment purporting to result from the introduction of the junior high school is that of Bruner (100) who carried on an investigation over a period of five years in a typical American city of 25,000 population. He found an increase in enrolment for grades 7, 8, and 9 of 45 percent and for grades 10, 11, and 12 of 55 percent. His findings indicate an efficient bridging of the gap between elementary and secondary units traceable largely to improvements in education resulting from the junior high school.

*Economy in time resulting from the junior high school*—The early advocates of educational reorganization favored a shortening of courses in order that the student planning to enter the professions might begin professional study at an earlier date than was usually possible in public school systems of the 8-4 type. Despite the early opposition of the Department of Superintendence (105) the idea of economy both through reorganization and personnel administration has steadily gained momentum. Over one-sixth of the public school pupils in the United States are now attending schools which require eleven instead of twelve years to complete the elementary- and secondary-school courses (112). Through individual promotions made possible through individual instruction, differentiation of courses, and differentiated assignments, many pupils are permitted to save time irrespective of the form of school organization in use.

Fritz (102:30) found that pupils progressed more rapidly through grades 7, 8, and 9 in schools organized according to the 6-3-3 plan than in schools of the 8-4 type. In the 8-4 schools more than three times as many pupils failed in grade 9B as in grade 8A, while in 6-3-3 schools the failure in grade 9B was only one and one-half times that in grade 8A. His study showed that pupils completed grades 7, 8, and 9 in the 6-3-3 school in less time than in the 8-4 schools, the saving in time occurring in the half-grades, 7B, 9B, and 9A.

Carpenter (101) in an evaluation of the effects of the junior high-school organization of Wabash, Indiana, found that the promotion rate had been increased 7.8 percent and that the mean number of failing pupils had been decreased 25.5 percent, while the holding power of the grades in question had increased 13.9 percent.

In a comparative study of the junior high schools of Minneapolis, Minnesota, with the 7th, 8th, and 9th grades of the same city organized under the 8-4 plan, Powers (109:119) collected data which support the claim of economy. For example, he found (a) that the percentage of over-ageness tended to decrease in the junior high school and to increase in the non-junior high school; (b) that the junior high schools collectively eliminated fewer retainable pupils than did the non-junior high schools; and (c) that the rate of promotion was more rapid and the rate of failure lower in junior high schools than in non-junior high schools.

*Provisions for individual differences*—Few people any longer question the fact of individual differences. Any doubt regarding the existence of marked individual differences among pupils of junior high-school ages is quickly dispelled by an examination of the data assembled by Koos (104:36-51). The question of importance, however, is the achievement of the junior high school in providing for individual differences. By organizing the 7th, 8th, and 9th grades as a separate unit of the school system, certain practices have been made possible that were either not possible or else possible only in a limited degree under the 8-4 plan, such as homo-



geneous grouping of pupils, multiple curriculums, flexible lesson material, promotion by subject instead of by grade, adjustment classes, exploratory courses, group and individual counseling, and extra-curriculum activities.

Approximately 70 percent of a sampling of 292 cities with population of 10,000 or more which maintain junior high schools makes provisions for individual differences through the organization of classes into ability sections (112). The practice is followed by 119 of 163 cities ranging in population from 10,000 to 30,000, by 57 of 89 cities from 30,000 to 100,000, and by 28 of 40 cities with population of 100,000 or more. Data are not available to show to what extent homogeneous grouping is employed as a means of providing for individual differences in the small junior high schools. However, for three-year schools enrolling fewer than 150 pupils Spaulding (111) concluded that ability grouping is economically impracticable.

It is impossible to furnish comparatively recent objective data to indicate the status of the various other methods used in junior high schools to provide for the individual differences of pupils. The practices of certain prominent individual junior high schools with respect to individual differences, such as Washington of Rochester, Latimer of Pittsburgh, Holmes of Philadelphia, and Blewett of Saint Louis are well known. Most of the larger schools have either multiple or flexible curriculums; provide supervised study, differentiated assignments, and graded lesson materials; offer both individual and group counseling and guidance; maintain exploratory courses; and encourage the organization of extra-curriculum clubs and activities. While the small junior high school cannot go as far as the large school in number of opportunities for individual pupils, it is possible for the small school to provide better opportunities to pupils for individual development than has been the case in schools of the traditional 8-4 type. This conclusion is based on the data presented by Spaulding in his study of small junior high schools in Massachusetts (111).

*Instructional results*—The data on the relative scholastic achievement of pupils in junior high schools and schools of the 8-4 type are conflicting. In Rochester, New York, for example, junior high-school pupils excelled the non-junior high-school pupils of like grades in subjectmatter tests in algebra and Latin, the pupils being paired according to their scores on the *Terman Group Test of Mental Ability* (110). Porter (108) in a study of 400 pairs of junior and non-junior high-school pupils in Minneapolis, using six standardized subjectmatter tests in reading, spelling, problem solving, computation, and thought and information in geography and history, found that the median scores and the median achievement quotients of the two groups were practically the same. Powers (109), however, in an extensive survey of the achievement of junior and non-junior high-school pupils in Minneapolis as measured by standardized tests in read-



ing, arithmetic, geography, and history found significant differences in favor of the non-junior high-school pupils.

Other data of similar character and of less consequence are available but are omitted here for the reason that a multiplication of such results is unnecessary. A different sort of appraisal is desired, which will measure the fundamental changes which the junior high school seeks to produce in its pupils.

*Summary*—The findings as a whole indicate that the junior high school has accomplished the special purposes which prompted its organization and determined its practices. Further evaluations are needed in order that deficiencies may be diagnosed, and corrective and remedial measures may be undertaken.

### Secondary-School Units

The secondary-school unit of the public school system has been characterized during the last decade by extensive reorganization. Prior to 1920, the regular four-year high school was virtually universal, with the exception of the junior high school. The *Biennial Survey* of the Office of Education for the period 1926-28 lists 4326 secondary schools as reorganized high schools in 1929 (125:1005). Four classifications are given, namely, segregated junior high schools, segregated senior high schools, junior-senior high schools, and undivided high schools. Under the four classifications are listed 28 different types of organizations.

*Trends in reorganization*—The reorganized high school is found in all types of communities as is shown by the data presented in Table 2 (123). A comparison of the data of Table 2 with those of previous biennial surveys warrants the conclusion that there is a marked trend toward reorganization of the secondary-school unit in both urban and rural communities. In the urban systems the trend is toward a division of the secondary school into two units of three years each, although the single unit of six years

TABLE 2—PUPIL ENROLMENT OF REORGANIZED SECONDARY SCHOOLS\*

Enrolment group	Number
Under 50.....	276
51 to 100.....	565
101 to 200.....	967
201 to 500.....	1,212
501 to 1,000.....	772
1,001 and over.....	534
Total.....	4,326

\* Data compiled from Statistics on Public High Schools (123).

is not uncommon. In the rural districts about three out of every ten secondary schools have departed in organization from the regular four-year high school (124:9). The different forms of organization for rural schools are shown in Table 3.

An examination of the status of reorganization in the ten states having the largest number of high schools and in the ten states having the smallest number shows that reorganization is widely diffused. The data presented in Table 4 show that some factor of state-wide significance determines the policy of the states with respect to reorganization of secondary schools rather than factors of local significance.

*Law as a factor in reorganization*—Studies by Clifton (115), Ashbaugh (113), and Green (116) of the secondary schools of Ohio, the state having the greatest number of secondary schools,<sup>1</sup> approximately a third of which are classified as reorganized schools, show an over-development of small schools due primarily to legislation which makes the consolidation of districts for the purpose of establishing a secondary school relatively easy. The result of an easy, flexible law is the establishment of numerous small schools, which, in comparison with the larger schools, carry on secondary-school work at a decided disadvantage.

In contrast with Ohio, Illinois, which has only 74 reorganized high schools out of a total of 989, has developed its secondary schools very largely under a law which has restricted the independent high-school district to areas of considerable size, namely, the township and homogeneous

TABLE 3—TYPES AND PERCENTAGES OF RURAL SECONDARY SCHOOLS IN THE UNITED STATES IN 1925-1926\*

Type of organization	Schools	
	Number	Percent
Regular four-year rural high schools.....	9,926	70.1
Junior-senior schools (3-3 plan).....	488	3.5
Junior-senior schools (6 years).....	823	5.8
Junior-senior schools (5 years).....	107	.8
Three-year rural high schools.....	1,256	8.9
Two-year rural high schools.....	1,272	9.0
One-year rural high schools.....	87	.5
Four-year rural junior high schools.....	60	.4
Three-year rural junior high schools.....	118	.8
Two-year rural junior high schools.....	26	.2
Total.....	14,143	100.0

\* Data compiled from Bulletin, 1930, No. 13. Office of Education (124:9).

<sup>1</sup>The *Biennial Survey* of the Office of Education for the period 1926-1928 reports Ohio as having 1,076 secondary schools, 337 of which are classified as reorganized.

community. The plan tends to insure adequate financial support for the high-school unit.

McNely (118) in a study of the township high schools of Illinois in 1929 found that the median assessed valuation of the 217 districts was \$2,740,000, the middle 50 percent ranging from \$1,669,999 to \$4,888,889. Such districts are financially able to support a comprehensive program of secondary education on a possible 2 percent tax. This conclusion is supported by the fact that 46.5 percent of the township high schools in Illinois are accredited by the North Central Association of Colleges and Secondary Schools and that all but seven of the remaining are accredited by the state department of education. Without adequate financial support the districts would not be able to meet the standards of the accrediting agencies.

The community high school of Illinois has made the standards of the township high-school law, with respect to the establishment of independent high-school districts, more flexible, and as a result a considerable number of small high schools have been organized, some with two- and three-year courses. The median assessed valuation of the community high schools is shown by Newenham (119) to be \$1,617,187.50, the middle 50 percent ranging from \$1,118,243 to \$2,330,882. The median enrolment of the 286 four-year community high schools in Illinois is 88, a figure considerably in excess of the regular four-year rural high schools for the country as a whole, although 50 percent less than that of the median township high school in Illinois.<sup>1</sup> The increased flexibility of the community high-school

TABLE 4—RANK AND PERCENTAGE OF REORGANIZED HIGH SCHOOLS IN THE TEN STATES CONTAINING THE LARGEST NUMBER AND THE TEN STATES CONTAINING THE SMALLEST NUMBER OF HIGH SCHOOLS IN 1927-1928\*

Rank	States with largest number of high schools		States with smallest number of high schools	
	State	Percent reorganized	State	Percent reorganized
1	Michigan.....	50.0	Utah.....	61.0
2	Indiana.....	40.1	Vermont.....	56.2
3	Ohio.....	31.3	New Hampshire....	44.8
4	Pennsylvania.....	29.3	Rhode Island.....	44.4
5	New York.....	26.0	Arizona.....	43.1
6	Iowa.....	19.5	Nevada.....	36.0
7	Missouri.....	16.5	Connecticut.....	33.7
8	Texas.....	16.3	Wyoming.....	20.3
9	Kentucky.....	13.4	Delaware.....	14.3
10	Illinois.....	7.5	New Mexico.....	14.1

\* Data compiled from Bulletin, 1929, No. 22, Office of Education (123).

<sup>1</sup> The average enrolment for rural high schools of the United States is 65.3 and for Illinois, 132.

law in Illinois has made possible the establishment of many high schools which could not have organized under the township high-school law. As a result, Illinois is already facing, in some of its community high-school districts, the same problem of finance which confronts Ohio in many of its small districts.

All of the studies cited warn against over-flexibility in the laws pertaining to consolidation or the establishment of independent high schools. The district should have as a prerequisite to organization a sufficient assessed valuation to make possible standard buildings, equipment, and instructional facilities without having to levy the maximum tax rate for the support of the school. The failure of many states to restrict the consolidation and the organization of independent high-school districts through law has created a problem which must be solved through the reorganization of districts as well as types of secondary schools.

*The six-year secondary school*—The reorganization of grades seven to twelve into a single unit of six grades has met with considerable favor in recent years in communities of various types. Simon (122), for example, in a study of the development of the six-year high school in Indiana, concludes that a six-year unit may be established in school corporations, whether they be rural, urban, or a combination of both, ranging in population from 500 to 3,000, providing the roads are passable during the winter months. He found weakness in the organization, such as scope of curriculum, lack of supervision, unsatisfactory qualifications of teachers, and uncertain tenure, which interfered with the successful operation of the unit. However, the rapid growth of the reorganization in Indiana (19 in 1919-20 to 258 in 1926-27) indicates that the reorganized unit meets the needs of certain types of communities better than the traditional four-year secondary school.

Bristow (114) has presented data for Pennsylvania showing that 40.7 percent of the pupils enrolled in the secondary schools of the state are in six-year institutions. He presents an impartial statement of advantages and disadvantages of the six-year unit, but leaves the impression that the reorganized secondary school of the six-year type is essential, if the junior high-school plan is to be made available to pupils of the upper grammar grades.

The six-year high school must not be considered as a development merely for the small city, town, and rural community. In 1927-28, such reorganizations were in operation in over 500 secondary schools with enrolments in excess of 1000 pupils.

According to Whitney (126), the six-year unit is not without its advantages for certain types of districts in our largest cities, even though the school system is committed to divided secondary schools of three grades each. Some of the six-year high schools are administered as units,

while others are separated into junior and senior divisions, although occupying the same building. The chief advantages claimed for the six-year secondary school are economy and the unification of the curriculum. Its disadvantages are size and the exposure of pupils to too many teachers. The disadvantages, while to some extent inherent, may be solved through efficient administration.

*Other types of reorganized high schools*—Data are not available to make possible a satisfactory evaluation of each of the 28 types of reorganized secondary schools recognized by the Office of Education. Most of the types are little more than individual variations caused by influences of a local character. Certain marked trends, however, appear in the data collected for the biennial survey of 1926-28, namely, (a) segregated junior high schools for grades 7-9; (b) segregated senior high schools for grades 10-12; (c) junior-senior high schools of six grades divided into two units consisting of grades 7-9 and 10-12 or grades 7-8 and 9-12; and (d) undivided six year high schools of grades 7-12 (123).

*Supplementary secondary schools*—The traditional secondary school, in spite of its numerous forms of reorganization, has failed to meet all the needs of a democratic society. As early as 1830 supplementary secondary schools for persons whose education had been neglected were anticipated in state legislation (121:298). A beginning in the establishment of evening schools was made prior to the Civil War, although rapid development did not take place until the opening of the present century. Now supplementary secondary education is offered not only in evening schools, but also in apprenticeship schools, cooperative schools, vocational courses in regular secondary schools, part-time and continuation schools, vocational courses, and regular vocational secondary schools.

Evening schools, especially in the large cities, frequently enrol more students of secondary-school age and above than are enrolled in the regular secondary schools (125:505).

Data collected by the U. S. Office of Education (125:497) show that in 1926, 673 cities reported 797,997 students enrolled in evening schools, and in 1928, 711 cities reported 993,985 students, an increase of 24.6 percent in two years. The large cities of 100,000 population and over, which have 50 percent of the urban population of the United States enrol 72 percent of the evening-school students. There appears to be a direct ratio between the size of city and the number of evening-school students enrolled. Table 5 shows the number of administrators, teachers, and students in public evening schools for the year 1927-28 in cities of 10,000 population and over.

Apprenticeship and cooperative schools have largely given place in recent years to part-time and continuation schools, which are now mandatory in about half of the states and optional in the remainder (128:232). Of the 463 cities reported in Table 5, 241 maintained part-time and con-



TABLE 5—NUMBER OF ADMINISTRATIVE OFFICERS, TEACHERS, AND STUDENTS IN PUBLIC EVENING SCHOOLS IN 1927-28\*

Number of	Population of cities			Total
	100,000 and over	30,000 to 100,000	10,000 to 30,000	
Cities.....	67	145	251	463
Administrators.....	748	267	164	1,169
Teachers.....	7,970	3,195	1,217	12,382
Students.....	462,657	129,398	34,266	626,321

\* Data were compiled from *Biennial Survey, 1926-28* (125:505).

tinuation schools for persons within the compulsory age limits and for those under 21 years of age. These schools had an enrolment in 1928 of 355,110 students (125).

Full-time vocational high schools, comparable in every respect with the regular or reorganized secondary schools, have found favor in urban communities in recent years as a means of providing youth of non-college interests with vocational training. In other schools vocational courses are offered for which federal aid may be received as in the vocational schools. The enrolment in such courses and schools in 74 cities in 1928 was 48,682 persons (125:505).

*The upward extension of the secondary school*—The upward extension of the secondary school to include the first two years of collegiate work usually offered in the traditional liberal arts college is an interesting development of the reorganization movement in public education. Factors, such as the increasing popularization of higher education, the desire of many parents to bring it nearer the home of the student in order to reduce the costs, and the constantly widening breach between general and professional or special education very generally created between the second and third years of the college course, have influenced the upward extension of the secondary school and resulted in the establishment of the junior college. Between 1902, the beginning of the movement, and 1928, a total of 145 public junior colleges have been established (127).

These institutions have been critically evaluated by Koos (117), and by standardizing and accrediting associations. As a result the public junior college is now recognized by legal enactment in nineteen states. The conditions under which public junior colleges should be established are now better known (120), and as a result many of the mistakes made in the organization of the earlier junior colleges should be avoided.

The development of the public junior college, particularly in California, has resulted in a reorganization of the public school system in certain

cities into three units, namely, an elementary unit of six years, a junior high-school unit of four years, and a senior high-school-junior college unit of four years. This type of organization may have the advantage of economy in administration claimed for it, but it fails to take into consideration the demand for economy in the process of education which has been a vital issue in public school reorganization.

*Summary*—Within a period of twenty years (1910-30), secondary education in the United States has undergone many changes in organization. At the beginning of the period the traditional four-year high school prevailed with few exceptions in all states. Public secondary education has been successfully extended during the period downward into the seventh and eighth grades of the elementary school and upward to include the two lower years of the liberal arts college. The trend in organization is towards independent junior high schools for grades 7 to 9, independent senior high schools for grades 10 to 12, and six-year junior-senior high schools for grades 7 to 12. The rapidity with which reorganization has taken place indicates a growing tendency to adapt the public secondary school units to community needs.

### **The All-Year School**

*Influence of rural conditions on school year*—The length of the school year in the United States has been largely an outgrowth of conditions in rural districts. When the district school was first established, the rural population was in predominance. Lack of labor for carrying on the work of the farms, especially during the late spring, summer, and early autumn months, made it expedient to keep the older children home for work in sowing, cultivating, reaping, and threshing crops of grain. The time thus spent had definite educational as well as utilitarian values to the children; it fitted the special needs of the early rural period of development of the country. Schools were frequently maintained in the summer for the younger children and in the winter for the older children thus making virtually an all-year school. The rapid commercial development of the country, the improvement of economic conditions, and the introduction of labor-saving machinery, freed many children from the necessity of work, resulting in increased school attendance; the improvement of roads made possible the attendance of the younger children in the winter. The two conditions resulted in the consolidation of the summer and winter terms into a single term with a long vacation period in the summer.

*Decrease in length of urban school year*—The influence of the long vacation of the rural school districts on the length of the school year throughout the country appears very markedly in the period from 1840 to 1915. In 1840, cities quite generally conducted schools for the greater portion of the school year. For example, New York City had a school year of 49 weeks; Chicago, 48 weeks; Buffalo, 12 months; Cleveland, 43 weeks;

Detroit, 259 days; and Philadelphia, 251.5 days (150:8-11). Reals (145:5-11) in comparing the reduction in city school years in the period 1841-1915, cites the following length of term in 1915 for the same cities: New York City, 193 days; Chicago, 193 days; Buffalo, 190 days; Cleveland, 192 days; Detroit, 191 days; and Philadelphia, 195 days. In contrast, the length of the rural school year was increasing during this period, according to Reals (145:5-11) who shows that the average length of the rural school year increased from 116.9 days in 1890 to 140 days in 1910.

*Rise of vacation schools*—As early as 1890, however, conditions were becoming prevalent which changed the attention of school officials from the declining school year to an increasing school year in the cities. Preparation for high school necessitating the meeting of specific scholastic requirements, the lack of suitable recreation for city children during the long summer vacations, and the conviction of social workers that juvenile delinquency tended to increase during vacation months, brought about the establishment of vacation schools. Private organizations had established vacation schools in the First Church, Boston, in 1866 (136) and in Providence in 1871. In 1896, the Civic Federation of Chicago opened a vacation school (136); and in 1897, the Board of Education in New York City opened a number of vacation schools. In Buffalo, funds and services for the establishment of vacation schools were furnished by teachers in 1898. By 1899 (136) twenty cities had established schools of the vacation type.

The early vacation schools were founded by social workers and philanthropic societies with the idea of counteracting the harmful effects of idleness and the influence of the city streets on children of school age (146). As the vacation schools were taken over by boards of education, the subjects of the regular curriculum were gradually introduced. The needs of backward children received growing attention; and while the recreation function of the vacation schools was not neglected, more and more the vacation schools tended to become academic in type. In 1916, the United States Bureau of Education (150) reported summer elementary schools with terms ranging from four to twelve weeks in 211 cities.

*The all-year school is an extension of the summer school*—The possibilities of the all-year school were first sensed when school systems introduced extended summer terms (132:60-65) in which pupils were permitted to earn advanced credit as well as to make up failures of previous terms. It was seen that a summer term of twelve weeks could be made to articulate with the regular school year of thirty-six weeks. In 1904, Bluffton, Indiana, established (136) such an all-year school, having four three-month terms. Newark, New Jersey, established all-year schools in 1912. Hebb (140) reports ten cities having all-year schools in 1923. In 1925, according to Reals (145:5-11), all-year schools were found in Albuquerque, New Mexico; Amarillo, Texas; Ardmore, Oklahoma; Bayonne, New Jersey; Bluffton, Indiana; Eveleth, Minnesota; Gary, Indiana; Mason City, Iowa;

Minot, North Dakota; Nashville, Tennessee; Newark, New Jersey; Omaha, Nebraska; and Tulsa, Oklahoma. Since Reals' study was made, Aliquippa, Pennsylvania, has established all-year schools (151) and Mason City, Iowa, has discontinued (142) the plan.

*The organization of the typical all-year school*—The plan of all-year schools in most general use provides for four terms of three months each, with vacations of one week at Christmas, one week at Easter, and two weeks in summer. Pupils may elect to attend the school the entire year, or they may fulfill requirements by attending any three of the four terms during a given year. Only in school systems where the all-year school has been adopted as an expedient to economize on buildings (151) have pupils been assigned to attend certain terms. Teachers for the summer term are members of the regular staff who desire to serve for the whole year, although they, too, are frequently permitted to serve any three of the four terms, which they may select.

*All-year school introduced on limited scale*—All-year schools generally have been confined to a comparatively small number of schools in the cities where the system has been adopted. Hebb (140) reports 15 all-year schools in Newark for 1922, including 8 elementary schools, one junior high school, one senior high school, and 5 vocational and special schools. Beveridge (129) reports one senior high school on the all-year plan for Omaha in 1925, with plans for 3 more all-year high schools pending. Clarke (134) reports only the practice school conducted in connection with the state normal school in Minot as being on the all-year plan. The greatest proportion of schools maintained on the all-year plan in a given city is in Nashville, where Weber (152) reports 64 percent of the pupils and 86 percent of the teachers voluntarily attending the summer term of the all-year schools.

*Levels of school work represented*—The all-year school includes practically all levels of school work conducted by large city systems. Junior and senior high school levels are represented, as are special types of schools and continuation schools. Many cities which have conventional summer terms for the regular schools have special schools at both elementary and secondary levels, and continuation and trade schools (133) operating on a twelve-month basis.

*Present status of all-year schools*—The literature on the effectiveness of the all-year school consists chiefly of opinions of advocates and opponents of the plan, many of which indicate strong bias. The factual data are limited in scope and very meager in amount (130). Many advantages of the all-year school over the school of nine or ten months, even when the latter is supplemented by regular summer school terms, have been advanced by proponents of the plan. On the other hand, school officials (137), teachers' groups (142), and parents (149) have at various times voiced disapproval of the all-year school.

One of the chief advantages advanced for the all-year school is that it offsets juvenile delinquency in the summer months. It is worthy of note that while the statement that juvenile delinquency increases during vacation periods is frequently advanced by social workers, practically no supporting data are cited. Hennessey (137) arranged a chart for the Bowling Green Neighborhood Association showing that according to police arrests of juveniles in a given area of New York City, the peaks in juvenile delinquency are Christmas time, Easter time, the latter part of June, and the month of September. It should be noted that Christmas and Easter are the usual times for vacation under the all-year as well as the conventional school, and that school in large cities is usually in progress during the latter part of June, and during September. Pierce (144) in a study of 2417 delinquent children in Chicago found that juvenile arrests for four months representing each season were: February, 492; May, 580; August, 610; and October, 735. Thus October, a school month, showed the greatest number of juvenile delinquencies, and August, the month included in the summer vacation, revealed no striking tendency with respect to child delinquency.

More economical utilization of the school plant has been cited also as an advantage of the all-year school. Corson (135) stated that advantages gained by a comparatively small number of pupils in Newark schools did not justify the costs. However, Odell (143) states that data from a survey of Newark schools, by Farrand and O'Shea, show costs per unit in all-year schools to be less than in the ten-month schools. Farrand and O'Shea (139) found that all-year schools would cost Newark \$150,000 more annually on a \$9,000,000 budget than ten-month schools with conventional summer schools, an increment of less than one-sixtieth of the entire budget and consequently not a determining factor with respect to all-year schools. Weber (152) states that full time use of the plant results in saving in unit costs, although he quotes no figures. Vanderslice (151) cites approximately \$15,000 saving in running expenses on three buildings yearly, and \$180,000 saving in new buildings by the all-year plan in Aliquippa, Pennsylvania.

The question of impairment of health of pupils attending the summer term of the all-year schools is often raised, especially by opponents of the all-year plan. Here, again, conclusive data are lacking. Dr. William Mayo (148) states that pupils are physically fit for twelve months of schooling, and that there is no reason that he can find to keep them from doing twelve months of work as other people do. Superintendent Balcom, Newark, is quoted as stating (147) that children with play needs should not be kept to the twelve-month, full-time working basis, but should have another type of school for mornings, with afternoons left free for play, for summer vacation. Balcom cites no data in support of this plan. Odell (143) found, according to physical examinations, that the physical condition of children



attending the summer term of the all-year schools of Newark was as good as that of the children who attended the ten-month schools and spent summer vacation at the seashore. He also reported that in answer to a questionnaire, 82 teachers stated that they suffered no impairment of health through teaching in the summer term of the all-year school. Vanderslice (151) found just as good health conditions in the all-year school as in the conventional school, citing 95 percent of attendance during a year in the all-year school as compared with 94.3 percent attendance for the same year in the conventional school. Weber (152) cites reports of medical inspectors stating that no bad effects are noted from attendance at the summer term of the all-year school in Nashville.

Objection to all-year schools on the ground that they cause administrative problems in transfer of pupils and articulation of pupils' work with regular schools, is answered by Farrand and O'Shea (139) in the statement that survey data indicate the superiority of the all-year school; hence administrative difficulties may be eliminated by placing all schools on the all-year basis. Roe (146) invites attention to the fact that the all-year school bases promotion on work regularly done; whereas summer schools promote on work irregularly done or entirely omitted through skipping.

The amount of acceleration which results from attendance in all-year schools is a subject of considerable controversy. Farrand and O'Shea (139) found only a negligible difference between the graduation ages of pupils completing the course of the all-year school and those completing the traditional schools. Consequently, they concluded that pupils are not being unduly hurried through the all-year schools of Newark. Weber (152) found 84.94 percent promotion at the end of the summer term as against 79.32 percent promotion at the end of the winter term in the same all-year schools of Nashville. Corson (135) in a study of 271 Newark pupils found that 25 showed no gain; 67, one-third year's gain; 59, two-third year's gain; 67, one year's gain; and 53, one and one-third year's gain. In one all-year school 50 percent of the pupils completed the eight-year course in six years. The Belmont School of Newark, in the six years preceding the introduction of the all-year plan, according to Corson, graduated 268 pupils; in the six years following, 836 pupils. The school graduated twelve more classes, consisting of 471 pupils, than would have been possible under the old plan. Brinkerhoff (130) found that rate of graduation in the all-year school was 22 percent greater than that of the ten-month school. Twenty-five percent of the graduates of all-year schools and 40 percent of the graduates of ten-month schools required more than eight years to complete the elementary school course. The all-year school graduates averaged 7.5 years to complete the elementary course; the ten-month school graduates, a little more than 8 years. The average yearly promotion rate in the all-year school was 103.6 percent; in the ten-month schools having conventional summer schools, 84.8 percent. The pupils of all-year schools had a slightly lower

grade-age than the pupils of the ten-month schools. In a study of high-school pupils, Brinkerhoff (130) found in March, 1924, that of a given group of all-year school pupils on the rolls in September, 1920, 49 percent graduated from high school; 15 percent remained in high school, and 38 percent dropped out; of a given group of ten-month school pupils, 38 percent graduated from high school, 13 percent remained in school, and 49 percent dropped out of high school.

The quality of work done in the all-year school as compared with that of the traditional school has been the subject of much controversy. Corson's objection to the all-year schools of Newark (137), on the basis that the pupils of the all-year school did not make good records in high school, was answered by the findings of Farrand and O'Shea (139), which showed that the mentality and social background of pupils attending all-year schools did not justify the expectation of a high standard of work in high school. The investigators even advised that special schools be established to meet the needs of many of the pupils in the districts of the all-year schools. Brinkerhoff (131) found that the average scores from state examinations in the subjects of arithmetic, English, geography, health education, history, and spelling, administered in June, 1930, were 34.85 for 5 all-year schools, and 35.42 for 6 ten-month schools having pupils of approximately the same intelligence quotients. Survey tests administered in 5 all-year schools and in 5 comparable ten-month schools showed the pupils of the ten-month schools to be slightly more proficient in reading and arithmetic than the pupils of the all-year schools. The mental-test scores showed a slightly lower mental age for the all-year pupils than for the pupils of the ten-month schools.

Data on attendance and holding power of the all-year school are cited by Weber (152) for the city of Nashville as follows: 13,000 pupils voluntarily attended summer term as compared with 20,000 in required attendance at the winter term, a proportion of 64 percent. Percentage of attendance during the summer term was 94; punctuality, 99.78. Beveridge (129) reported that an all-year high school in Omaha, which, under the traditional organization, had 90 percent of the pupils taking two-year commercial courses, had been obliged to abolish two-year courses in favor of four-year commercial courses. Corson (135) reported that 74 percent of pupils in five all-year schools in Newark enrolled for the summer term. Farrand and O'Shea (139) found that all-year schools of Newark held a group of dull children in school longer than the traditional schools. Lovell (141) found that three ten-month high schools graduated 9 percent of enrolment as compared with 19 percent by all-year high schools.

*Summary*—Great diversity of opinion obtains concerning the efficacy of the all-year school as compared with the regular schools of nine and ten months supplemented by voluntary attendance at summer schools. Limited data appear to support the contentions of the advocates of the

all-year school. The history of the all-year school in Newark, if considered typical, shows much uncertainty on the part of teachers and school officials. The all-year schools were established in 1912; met with general approval for more than a decade; were later recommended for abolishment by the superintendent and were abolished by the board of education; were reestablished by the board on protests of principals and teachers; and were then surveyed and approved by an impartial survey board. However, as recent as 1930 (147) the all-year schools of Newark were again the subject of administrative disagreement. Much more complete data concerning the all-year school than are now available appear necessary before the merits of this form of school organization will meet the general approval of school officials and the public.

## CHAPTER III

### Pupil Classification and Grouping

THIS survey of research in ability grouping will seek primarily to present a summary of the data on *how* ability groups work, and *how well* they work. Following a brief statement concerning individual differences, the various bases used for sorting individuals into different ability groups will be discussed. The common plans of ability grouping and evidence as to their relative effectiveness will be presented. Finally, some attention will be given to the data on the individualization of instruction as the logical next step in ability grouping.

#### Introduction

*Definition*—The term *ability grouping* as used in this treatment means that organization of schools in which pupils are classified for purposes of learning and teaching into groups which are relatively homogeneous with respect to one or more significant characteristics. Ordinarily it includes not only reclassification of the pupils who have been gathered in a given grade into groups of greater homogeneity but also an adjustment in content and method to the differences among the groups thus formed. The term, as commonly used, refers to grouping only within the range of normal intelligence, or approximately between intelligence quotients of 70 and 130. This usage is followed in the present report. Segregation for instructional purposes of children below 70 I. Q. (mentally deficient) or of children above 130 I. Q. (mentally gifted) is here considered as a special provision for the education of exceptional children and is not classed as ability grouping although strictly it might be classed as such. Nevertheless, for present purposes, this analysis of the bases and plans of ability grouping is confined to the typical situation found in the "regular" classrooms of the school.

*General point of view*—Ability grouping is here considered basically as an extension of grading. Just as a grade group in a particular school, such as high-sixth, is made up of pupils who are more like each other than are the pupils of the entire school, so an ability group within that grade is made up of pupils who are more like each other than are the pupils in that entire grade.

Ability grouping, from this point of view, is synonymous with homogeneous grouping, and is obviously a further step beyond grade classification toward complete individualization of instruction. It is clear that the largest group of pupils which can be perfectly homogeneous is a group of

one, or a single pupil. The logical limit of homogeneous grouping is individualized instruction.

*Basic assumptions*—Three assumptions underlie the concept of ability grouping. The first and most important is that children differ greatly among themselves, even among those of like age and sex. This assumption rests upon considerable factual evidence and is no longer disputed by many.

The second assumption is that although the differences among individuals are large, they may be classified into groups within which the individual differences are relatively insignificant, but between which the differences are large and significant. Expressed otherwise, this assumption may be said to be that group differences are more important instructionally than are individual differences. For example, the difference between a group of average learners and a group of slow learners is assumed to be of greater import than are the differences among individual children within either group. The evidence relating to this assumption is slight in amount and uncertain of interpretation. The assumption cannot be said to be demonstrated. Final proof waits to be secured through the comparison of the instructional results obtained when all else is the same except the difference of ability grouping on the one hand (adjustment to group differences) and individualized instruction (adjustment to individual differences) on the other.

The third assumption is that the changes in children at which the school aims occur in greater degree and with greater certainty or with greater ease of instruction when the children work in homogeneous groups than when they work in heterogeneous groups. That is, other things being equal, the instructional process is assumed to be more effective and more efficient in a system employing grouping by ability than in a system where such grouping is not in existence. This assumption is susceptible of experimental study by the comparison of the growth of pupils taught in homogeneous groups with the growth of similar pupils taught in mixed groups. A number of studies of this type will be reported in this chapter.

Another list of the basic implied assumptions involved in homogeneous grouping is given and critically discussed by Keliher (227).

*Extent of movement*—The movement for ability grouping apparently began at about the same time in elementary schools and in junior high schools, but it grew more rapidly at first in the latter probably because of the larger number of pupils in each grade in any one school and the consequent ease of forming ability groups and of adjusting the instruction to their different needs (283). Data from the Office of Education regarding practices in ability grouping in the United States were cited in Chapter II.

In 1928 Viele stated that 21 of 32 junior high schools from 14 different states from which she received information had some kind of homogeneous grouping in operation (286:109). Writers on the junior high school, such



as Ryan and Crecelius (265), and Harrington (216:10), take homogeneous grouping for granted. Ability grouping has been tried and appears at the present time to be growing in popularity from the elementary school to the college (175:1-6). Opinion is divided, however, as to the value of ability grouping. McGaughy (243) is one of the most vigorous opponents and presents the arguments against it.

The most comprehensive summary of the arguments on both sides is that given in the *Ninth Yearbook* of the Department of Superintendence (251:121-26). Advantages were listed much more frequently than disadvantages by the 500 superintendents of schools to whom the questionnaires were addressed. The most frequently mentioned advantages and disadvantages were as follows:

#### ARGUMENTS IN FAVOR OF HOMOGENEOUS GROUPING

	Frequency of mention
1. Homogeneous grouping makes differentiation of curriculums easier. There is better opportunity for differentiation of courses of study without resorting to individual instruction. It takes care of the assignment problem. ....	195
2. Slow learners in separate groups are not discouraged by the superiority of others, but compete on more equal terms and develop their own leaders. Grouped together pupils feel freer to admit their slowness and to ask the questions necessary to their better understanding. They do not feel awkward or timid due to being conscious of the brighter and faster pupils. ....	173
3. Homogeneous grouping places pupils in competition with others of fairly equal ability. It sets a pace that is a real challenge and a standard that is attainable. ....	153
4. Children having more than average ability tend to form habits of idleness, inattention, and mental laziness if compelled to mark time to classes made up of average and below average pupils. When superior pupils are grouped together activities and discussions are on a higher plane. Greater opportunity is offered for more oral expression than others can follow. ....	152
5. Homogeneous grouping enables the teacher to adapt methods of teaching to meet the needs of varying groups. He does not have to interest all in a presentation fitted only for a few. He can make a much more effective division of the time allotted to development, drill, and application. He is allowed more latitude in experimentation. ....	115
6. Homogeneous grouping facilitates the work of the teacher. It is easier to teach a more nearly homogeneous group. The faster groups can be made larger and the slower groups smaller, so that the latter may receive more individual attention. Since the range in the ability of the group as a whole is so much less, the teacher sees more clearly the needs of each individual. ....	113
7. Competition is keener, pupils are more likely to work up to their capacities—better work results. ....	100

#### ARGUMENTS AGAINST HOMOGENEOUS GROUPING

1. With homogeneous grouping, the slower groups lose the stimulus and the contributions of the brighter pupils. ....	150
2. Pupils put in the lower ability groups sometimes develop a sense of failure and inferiority. ....	99

3. Pupils put in the higher ability groups are apt to develop a superiority complex. It may cause bright pupils to under-evaluate the worth of qualities other than intellect, and thus promote intellectual snobbishness. It prevents brighter children from learning tolerance for those with less intellectual ability. . . . . 75
4. Homogeneous grouping is undemocratic and tends to create class distinctions in the minds of some pupils. Through it there is danger of developing an intellectual caste . . . . . 68
5. The adjustment of teachers to the various groups is difficult, particularly the lower groups. Some teachers object to teaching the dullest group. Relatively few teachers can handle this group competently. . . . . 64
6. With homogeneous grouping, there are no outstanding leaders to inspire the slower groups. The slow child may become discouraged and even slower. . . . 63
7. It is very difficult to divide pupils into truly homogeneous groups, for a group that is more or less homogeneous in one subject may be heterogeneous in another. To illustrate, a group that has more or less the same ability and test scores in arithmetic may differ widely in ability and test scores in geography 56

*Some important questions*—Several questions of considerable interest will be referred to as occasion arises. One is the matter of the degree of permanence of the grouping. Should a child continue in the same ability group for a month, for a year, or for his entire school life?

Another is the matter of the consistency of the grouping for different subjects of study. Should a child be in one ability group for all subjects, or might he be in different groups in different subjects?

Another is the relative emphasis upon adjustment in type and amount of work and upon adjustment in rate of work. Should the dull groups be given more than average time to do the standard piece of work, or should they have certain portions deleted from their course of study? Should the bright groups do the standard work in less than average time, or should they have additional experiences added to their course of study? In short, should the adjustment be time-saving or enrichment? Odell's arguments for time-saving (254) and Holmes' arguments for enrichment (220) are illustrations of many discussions on this subject (257, 207, 155).

### Differences in and among Individuals

*Individual differences*—The existence of differences among individuals with respect to any given characteristic—physical, mental, educational, or emotional—is perhaps the most certainly proven fact in the whole science of education. Although no effort will be made here to review the evidence because one number of the *Review* is to be devoted to the topic, the conclusion may be given that individuals differ widely in any given characteristic; and that, for most traits that have been investigated, the distribution includes a few individuals with little of the trait, a great many with somewhat more or less than the average amount of the trait, and a few individuals with much of the trait. Many such distributions approximate statistical normality.

Thorndike's summary (278:386-87) is helpful, although it gives little attention to the differences within the great middle group:

... unless peculiar causative or selective agencies are at work, there will be a few individuals who will possess so little of any given capacity or quality, or combination of capacities or qualities, as to be obviously 'defectives' in it, as well as a few who will possess so much as to be obviously 'prodigies.' There will be a larger number who will possess so little as to merit the popular term 'weak' in color vision, memory, self-control, moral sense, general intelligence or whatever the trait may be. These, again, will be balanced by an approximately equal number of 'remarkable' or 'exceptionally gifted.'

If the mental trait in question is the compound of many traits which we call intelligence, we shall find at the lower end of the distribution curve children whom medical diagnosis would name idiots, and next to them a number who would be termed imbeciles, and nearer still to the average the group to whom the name weak or feeble-minded would be applied. If the mental trait is the compound called 'morality,' the individuals at the low extreme will perhaps be diagnosed as cases of 'moral insanity' or as 'moral degenerates.' If the trait be more specific, for instance if it be ability to learn to spell, ability to learn to read, cruelty, musical ability, memory, visualizing power or what not, we shall find few, if any, special names for different degrees of its possession, though there will as truly be defectives in respect to any such specific mental trait as in respect to general intelligence.

Among the many books and articles dealing with the amount of individual differences may be mentioned Terman's study of differences in intelligence (275), Chamberlain's investigation of differences in ability to understand literature (177), and Freeman's general discussion of individual differences (206).

Two questions relative to individual differences—that of magnitude or significance, and that of permanence—have a decided bearing upon the need for ability grouping and upon the selection of the particular organization to be used, but they are believed to belong primarily to that number of the *Review* devoted to individual differences. It is obvious that the existence of individual differences may be granted and yet their significance for instructional purposes denied. The question hangs upon the relative magnitude of the differences. Also, unless such relative differences tend to persist over a period of reasonable length, it seems apparent that ability grouping, as the term is ordinarily used, is scarcely practical. There does seem to be fairly general agreement, however, that the differences among children are large enough to demand consideration by school people, and further, that these differences are relatively constant over at least a short period of time.

*Trait differences*—There is, of course, another type of question which bears closely upon the feasibility of ability grouping as an adaptation to individual differences. It is the matter of differences in an individual himself among the various traits which he possesses. Such differences, as, for example, the differences in a child's height, dental development, mentality, reading ability, spelling ability, when these characteristics are

expressed in common terms, are called trait differences. That is, trait differences means the variation in many traits within one individual; individual differences, on the contrary, means the variation in one trait in many individuals. If these two variations were equal, it would seem theoretically that grouping on the basis of general ability would be only relatively homogeneous, and that separate ability groups for different fields of work would be the only way of forming truly homogeneous groups.

Curtis (184:147) presents data which show that 80 percent of the children in grade 4B in Detroit are spread over three to four of five possible different achievement groups in the final semester tests with respect to the standards in the five subjects considered.

Kelley (228: 97-145) defends vigorously the importance of trait differences, or what he calls "individual idiosyncrasies."

Hull reports a study of 105 high-school freshmen with 35 different tests, from which he concludes that the distribution of traits within the individual has the same general characteristics as the distribution of individuals in a single trait. He found that the average trait variability for the entire group was 6.33 points as compared with a variability among individuals of 7.00. After allowing for inaccuracies of measurement he concluded that the trait differences he investigated average approximately 80 percent as great as individual differences (224:102-104). Elsewhere (223), he reports ways and means of measuring these trait differences.

### **Bases of Grouping**

A wide variety of bases have been proposed and used for ability grouping at various instructional levels.

*Teacher judgment*—The basis of judgment which has been used for the longest time in the formation of ability groups and in the selection of children for special adjustment through re-grading is teacher estimate. Practically none of the later students of the problem have been willing to omit teacher judgment as one, at least, of the bases of grouping. Most of the studies which have been made to determine the degree to which teacher judgment is valid in the selection of bright and dull pupils have found that teachers predict success reasonably well. For example, Varner (285) found that teachers could select from 20 to 40 percent of the bright and from 40 to 60 percent of the dull pupils, when brightness and dullness were measured by intelligence quotients secured from the scores on the *Haggerty Intelligence Examination*. Varner found that it is more difficult to select the bright pupils than to select the dull pupils, and that it becomes less difficult to select the bright and dull pupils as they become older.

Clerk (178), in one of the first studies of ability grouping, reports basing the grouping on previous marks in similar subjects.

Kefauver (226) endeavored to evaluate different bases for ability grouping of pupils by the method of correlating these bases with the

success of pupils during their first semester in the junior high school. His conclusion was

. . . the most important single source of information for predicting success in the first year of the junior or four-year high school is the judgment of the teachers in the elementary school. (226:111.)

Kefauver states further that regardless of the combination of factors used for distributing pupils to ability groups, it should always contain a composite of marks in the school or a rating of capacity by the teachers, or both.

*Intelligence tests*—In the last ten or fifteen years, scores on intelligence tests have been the basis of grouping which has been most widely discussed and perhaps most generally used. That use has grown greatly, despite the fact of the growing recognition of the inadequacies and imperfection of the measurement of intelligence (and achievement). Kelley (228) and other writers have shown the unreliability of single measures of intelligence, particularly those secured from group intelligence tests.

There has been some question also as to whether the basis should be a measure of mental maturity, such as mental age derived from an individual intelligence test, and raw score on a group intelligence test or a measure of mental brightness, such as the intelligence quotient secured from an individual intelligence test, a letter rating, or other device for interpreting a raw score on a group intelligence test in relation to chronological age. At the kindergarten and first-grade level, the age range is ordinarily relatively small as compared with the situation in the upper grades, and here it has made less difference which of these types of measures was used as the basis of grouping.

One of the earlier studies using raw score is that of Berry, in which he reports the classification of ten thousand first grade children in Detroit in September, 1920, on the basis of a group intelligence test. The pupils were sorted into three groups, called "X," "Y," and "Z," where "X" meant the highest 20 percent, "Y" the middle 60 percent, and "Z" the lowest 20 percent. Berry summarizes:

By means of a group intelligence, the pupils entering the first grade were classified with sufficient accuracy to be of marked help to the teachers. The accuracy of the intelligence ratings was confirmed by the judgment of the teacher in almost 70 percent of the cases. Ninety-five percent of the principals reported that the intelligence ratings were of sufficient value to justify their being given. (163:202-203.)

Although score on an intelligence test was the sole basis of original placement in groups, Berry provided for allowing the teacher to correct mistakes in the classification of pupils by shifting into the proper group any pupil who, in his judgment, had been misplaced by the intelligence rating. Berry found that 77.8 percent of the ratings of the "X" group were confirmed by the teacher, 67.3 percent of the ratings of the "Y" group, and 63.4 percent of the ratings of the "Z" group (163:197).



A somewhat similar study of the same general type was that reported by Dawson, who used, however, the *Stanford-Binet Scale* instead of a group intelligence test. He also used a mental age basis, including in the "X" or highest group children 7 years or older mentally, in the "Y" or middle group children 6 to 7 years mentally, and in the "Z" or lowest group children  $5\frac{1}{2}$  to 6 years old mentally. Teachers were free to make transfers in the first ten weeks, yet 85 percent of the pupils remained in the same group at the end of the ten-week period. (191:415).

Both Berry's and Dawson's studies dealt with first-grade children and the testing was done as far as possible in the kindergarten. Other reports of ability grouping experiments in which intelligence tests were used as the basis have been made by Harper (215), who worked on the eighth-grade level, and Layton (232), who reclassified an entire school.

Woody (295) did not actually group pupils on the basis of intelligence, but he studied the effectiveness of differentiation of high-school pupils on the basis of the *Army Alpha Test*. The correlation which he found for 83 high-school freshmen ranged from 0.33 to 0.47 between the *Army Alpha Intelligence Test* and six different achievement tests in reading, English, algebra, and Latin.

A very early use of intelligence tests in sectioning is that in Public School 77, New York City, in 1914, as reported by Adler (154).

✓ Coxé (187) proposes a classification of pupils first into grades on the basis of chronological age practically alone, and then the classification within grade on the basis of scores on mental or educational tests. Hardwick (214) describes the plan he used in a junior high school of grouping simply on chronological age.

Keener (225) reports the classification of five thousand pupils in junior high schools in Chicago in 1924 on the basis of point scores on the *Otis Classification Test*. He states that in the beginning some of the junior high-school principals and teachers were skeptical as to the value of the test results in grouping; but after nearly two years of trial, they almost unanimously consider homogeneous grouping the best means of caring for individual differences under present conditions.

✓ *Educational tests*—The results of educational tests also have been used widely as the basis for ability grouping. As in the case of intelligence tests there is the question as to whether educational age (corresponding to raw score) or the educational quotient (equivalent to interpreting raw scores in relation to age) should be used. Beeson and Tope (161:292) recommend the educational quotient as the basis of grouping within the grade, but the educational age as the basis for grade placement. This is the most frequently given recommendation in other statements also.

Hollingshead recommends educational age. He studied the effect of dif-

ferent bases of classification upon the range in other measures of a group of fifth-grade pupils. He states that:

... for the pupils under consideration in this study any grouping that might be effected on the basis of the mental or educational ages would lack homogeneity in achievement in reading and arithmetic. The use of educational age results in the greater reduction in range and standard deviation in reading, from a range and standard deviation for the total group of 72 and 12 months to a range of 42 months and a standard deviation of 8.9 months. In arithmetic, using educational age as a basis reduces the range from 66 to 63 months and the standard deviation from 10.2 months to 9.8 months (219:52).

When the intent is to secure ability groups in a particular subject, such as history, algebra, or reading, the use of educational tests in the subjectmatter field is commonly recommended in preference to the use of general tests of intelligence or achievement.

*Other proposed bases*—Thomson (277) used physical and athletic ability as the basis of grouping. Waples (289) reports the grouping of high-school pupils at Homestead, Pennsylvania, on the basis of occupations of fathers. Ryan and Crecelius (265:90) recommend the use of social age and anatomical age as factors. They propose several measures of anatomical age, including height and weight and radiographs of the carpal quadrilateral, but consider dentition age to be the most practical and economical measure at present. However, the correlations between measures of anatomical age and other measures such as mental age and educational age are insignificant, according to Cook (180). Freeman (206) by implication urges the placing of more emphasis upon non-intellectual traits and upon the environmental conditions.

*Composite measures*—The eclectic approach to the question of bases of grouping has been adopted practically in most situations, some sort of combined score being planned and used. Kelley, though not speaking particularly about ability grouping, gives the following minimal list of traits (in addition to certain items, such as height, which he considers of importance only when really exceptional) to be studied for the understanding of typical school children (228:123-24):

1. Maturity, or present chronological age
2. Verbal intelligence
3. Social intelligence
4. Activity and mechanical intelligence
5. Interests along (2), (3), and (4) and along other lines specially noted by the child
6. Ability with reference to quantitative phenomena—computation, etc.
7. Ability with reference to spatial relationships—geometrical forms, etc.
8. Memory with reference to verbal material
9. Special sensory or motor interests and abilities.

Neither Kelley, nor Ryan and Crecelius (265) propose any very objective plan for combining the various types of information in the actual process of sectioning. In fact Ryan's and Crecelius' procedure is based

chiefly upon only two or three of the factors, and the exact extent to which the other bases are utilized is not made clear. Similarly, reports like those of Maher (239), Blumenthal (166), and Armentrout (157), in which more than one basis of grouping was used, do not offer a plan of quantitative combination of the bases used.

Ross and Hooks, after reviewing various studies made by them and others of the correlation between various measures and success in the first year of high school, conclude:

(1) that the most valid or truthful basis for predicting high-school achievement in the first year of senior high school is a combination of factors from the pupil's grade-school record, including age, grade-progress, and attendance, as well as teacher's marks, the correlations averaging above .60; (2) that the grade-school record affords a more reliable or consistent basis of prediction than any other available, the correlations in three widely-scattered school systems showing remarkable stability; and (3) that without question the grade-school record of the pupil is the most usable or practical of all bases for prediction, being available wherever cumulative records are kept, without cost and with a minimum expenditure of time and effort (264).

Kefauver (226:111-14) also concludes from an investigation of the merits of different measures in predicting general success in the first year of the junior or four-year high school that marks given by the teacher stand first, the general intelligence test second, and a general achievement test third. He proposes a composite of these three items. However, if a different distribution is to be made for each subject, he recommends that the composite include:

(1) a combination of marks obtained in the preceding grades on a rating of capacity by the teachers in these grades, or both; (2) scores on an achievement test covering or directly related to the content of the course; and (3) the intelligence quotient or the score on a mental test (226:114).

One of the few attempts on record to arrive at numerical weights for the several factors in a composite basis is that of Corrigan and Kennedy (182). They determined the multiple regression equation predicting achievement in the seventh grade (measured by comprehensive examinations of the objective type) from brightness (measured as the intelligence letter rating from group tests), chronological age, and estimate of elementary-school teachers. For the units with which they worked, the coefficient of partial regression upon brightness was 1.26, upon teacher judgment, 1.01, and upon age, .44. These figures were rounded to weights of 5, 4, and 2 for practical use in grouping. Brightness was expressed on a scale of "1" to "5"—"1" means the highest 8 percent of the age group, "2," the next 12 percent, "3," the next 60 percent, "4," the next 12 percent, and "5," the lowest 8 percent. Teacher judgment was expressed similarly in numbers from "1" to "5"—here "1" means best. Age was expressed in years. By the use of this method they secured a reduction in average standard deviation in composite achievement scores per section

of from 6.7 points for the method of grouping formerly used to 4.9 points for their method, or a decrease in dispersion of 27 percent.

Marzolf (241) proposes a similar approach to the problem through the computation of regression coefficients. Elliott (201) also studied the influence of chronological age, mental age, and elementary-school rating on achievement of high-school pupils.

Brooks (171) reports a study of the accuracy of sectioning first-year junior high-school students on various bases, the criterion being scholarship in junior high school. He also computes multiple correlation coefficients.

Reavis and Butsch (263:61-76) review a number of masters' dissertations at the School of Education of the University of Chicago, in which the purpose was to evaluate various scores on tests and other measures in the prediction of success and the classification of pupils.

*Summary on bases of grouping*—It is evident that many different bases have been used. It appears further that the present tendency is to use several bases rather than any one of them. Some progress has been made toward the discovery of the numerical weights to be assigned to the factors when they are to be combined in a composite score. Also, there is some evidence that questions are being raised and investigated regarding the validity and reliability and administrative feasibility of various proposed bases.

The available evidence at the present time suggests that teacher judgment and results of intelligence tests are of approximately equal importance for ability grouping, and that both should be used in the classification of pupils into homogeneous groups. Other factors should undoubtedly be utilized also, and indeed different ones are used in various places with a degree of success, but none of them is in general use. However, where it is possible to group separately in different subjects it is agreed that educational tests are of very great value.

### **Plans of Ability Grouping**

*Special classes for retarded and gifted*—Historically, the first form of ability grouping to be widely used was the segregation and special teaching of the mentally retarded, which is generally considered to include the lowest two percent of the population. There have also been sporadic efforts in the direction of the segregation of the gifted. This term is used with a wide variety of meanings, but will here be assumed to include only the top 1 or 2 percent. Neither of these groups is being considered in this article, because ability grouping is defined, for the purpose of this summary, to include only the range of intelligence quotients from 70 to 130 approximately. Some of the workers in this field who have treated special classes are Whipple (292), Flinner (203), Lee (233), Hilleboe (218), and Goddard (209).

*Simple grouping*—The earlier workers who were interested in ability grouping were concerned first with securing reasonably homogeneous groups, and left the matter of adjustment of standards, methods, and materials to the classroom teachers; although their statements indicate that they recognized the needs along these lines. Many of the writers limit their discussions to the relative advantages and disadvantages of ability grouping. Thus Glass (208), Freeman (205), Ashbaugh (158), and Worlton (299) present the advantages and answer the objections which have been raised. Brooks' statement (172) and that of Shapiro (267) are examples of criticisms of ability grouping.

The number of groups has been a frequent subject of discussion. Berry (163) recommended for elementary-school pupils three groups, "X" or the upper 20 percent, "Y" or the middle 60 percent, and "Z" or the lower 20 percent. Some such threefold classification seems to have been very generally used in elementary schools throughout the country.

In junior high schools there has been much less uniformity of practice. Many schools use the three-fold classification which is common in elementary schools. Others, as in Detroit, use as fine a classification as the number of sections per half-grade will permit (216:10). Others use some classification between these limits.

The foregoing references have presupposed a classification into homogeneous groups which would constitute instructional sections of a full class size and which would be in effect in all subjects. A variation of this procedure increasingly found is the formation of homogeneous subgroups within a class, and these, of course, may vary from subject to subject. Such a procedure is especially valuable in small schools where there are less than three or four classes in each grade or half-grade (depending on whether annual or semi-annual promotion is in effect). Davis (190), Logan (237), and Buckingham (174:276-81) describe various modifications of ability grouping *within* the regular instructional unit, the class.

Another variation of simple grouping is the grouping of entire sections separately for different subjects. This usually requires some plan of parallel programs, so that all pupils may have the same subject at the same time. Baird (159) reports such an attempt in reading and arithmetic.

Still another variation, and one that is particularly appropriate for small schools, is the use of vertical rather than horizontal grouping. Instead of putting together in a class pupils of the same grade and of different ability levels as is commonly done in small schools, pupils of different grades are put together if necessary but not pupils of different ability groups. The purpose, of course, is to secure groups as homogeneous as possible. The assumption is that bright high-fifth-grade children, for example, in mental maturity, brightness, and achievement, are more like bright low-sixth-grade children than they are like average or dull high-



fifth-grade children. Kepperling (229) describes such an organization in her school. A somewhat similar plan is presented by Taylor (274).

*Differentiated standards*—Differences in requirements for pupils of various abilities have resulted largely from the use of ability grouping. Detroit has published for the guidance of its teachers a set of *Promotion Standards for X, Y, and Z Groups* (193).

The differentiated assignment plan, though not restricted to use with ability groups, should be mentioned in this connection. Brief accounts of the plan are given by Reavis (261) and by Miller and Leonard (244). Lincoln and Wadleigh (235:749) used this plan with the ability groups in the Reading junior high schools.

*Differentiated rates of progress*—Ability grouping is frequently accompanied by adjustments in the rate of progress of the different groups. Indeed, such differentiation has been, in many cases, the prime purpose of the grouping. It is one of the oldest forms of adjustments to group differences. The New Cambridge Plan (188:375), inaugurated in 1910, provided two parallel courses of study, one of eight years for the average pupil, and one of six years for the gifted pupil, with natural transfer points where a pupil might shift from one to the other, and thus take any amount of time between six and eight years. Odell (254) reports a somewhat similar double track system adapted for small elementary schools, in which ungraded rooms are utilized. Zornow and Pechstein (300) describe a modification at Rochester in which slow moving classes were organized in grades one, three, and five, which allowed slow groups to take a longer time for finishing without failing and repeating. The plan used in Enid, Oklahoma, which provides for different rates of progress by the "rapid-working group," the "average group," and the "vocational group" is described by Price (256). A recent use of differentiated rates of progress is reported by Gordon (211).

*Differentiated materials and methods*—Almost from the first efforts at ability grouping, its advocates have urged that more be done than merely to segregate children of differing abilities. The plea has been to develop and use in each group those methods and materials of instruction which were best suited to the characteristics of the children in that group. Such adaptations are necessarily based on the needs of the groups. Consequently, there has been considerable study of these needs and characteristics.

Theisen (276) showed how great were the differences in accomplishment and in general response to the classroom situation among segregated groups in the seventh grade in Cleveland. He found, for example, that the difference in average achievement between the highest and lowest groups in arithmetic was more than one and one-half years progress, and in reading and language more than two years. He reports typical comments made by teachers regarding the work of the different sections. These comments indicate that the groups differ greatly, not only in achieve-

ment but also in interest, enjoyment, and appreciation, and that the differences are found to some degree at least in all the subjects. His conclusion is that the teaching process should take account of such observed differences.

French (207) explains a plan used in Drumright, Oklahoma, in which the school day is completed earlier than usual. Middle and slow groups continue drills and reviews, while high groups may elect special courses in mineralogy, parliamentary law, scout cooking, and household decoration, which are offered for six-week periods. Greenwell (213) describes differences in treatment of first-grade classes in reading. A typical adjustment is the introduction of phonics much later for slow groups than for fast groups. Stern (271) reports adjustments in the field of social studies at the high-school level.

Cutten (189) urges differentiation in work demanded for the "pass degree" and the "honor degree" given in college. He suggests that abler students should be given more initiative and freedom in their work. For example,

. . . the college which accepts the responsibility for training the intellectual aristocracy must furnish a curriculum which contains the possibility of training along active, constructive, and creative lines (189:483).

Another study at the college level is that of Whitney (293), who reports experience with the sectioning of college English classes for freshmen, in which considerable adaptation to the groups was made in subjectmatter. Constance and Hanna (179) describe administrative and instructional adjustments at Bradley Polytechnic Institute in freshman English classes.

A suggestive report of differences among junior high-school groups in English is given by Chamberlain (177). Her "A" group, with an average I. Q. of 139, was very much interested in imaginative material and creative work, while the "C" group, with an average I. Q. of 105, was more interested in practical topics and drill. She shows how rarely "C" group numbers understood the real purpose of a writer when he expressed himself indirectly or figuratively.

Baker (160) has provided what is perhaps the most comprehensive account of the differences teachers generally find between bright and dull pupils. This report is given separately for the different subjects taught in the elementary school. As to content, he proposes for dull pupils, as contrasted with bright ones, less material, shorter units, more concrete material, and texts which have been re-written in simple vocabulary and style. For bright pupils he urges all types of enrichment and independent work. As to methods, he says (160:97),

In dealing with bright pupils the teacher must specialize upon main issues and direct the general policies. He must be able to short-cut minor details in the interest of making rapid progress. The teacher of dull pupils must be able to make himself a foreman

who is primarily concerned with the administration of details. He must have infinite patience to wait for results. Both types of teaching require resourcefulness, intelligence, and adaptability.

Baker presents also (160:105) a table of average mental ages which may theoretically be expected in "X," "Y," and "Z" groups in different grades, when a promotion rate of 100 percent is assumed in each group. Table 6 shows how great is the difference in mental maturity between "X" and "Z" children in the same grade. For example, a typical B6 "Z" has about the same mental age as a typical B4 "Y" or a typical B3 "X."

Another helpful summary of adjustments desirable for different levels of ability is that given by Broady (170:58-66). Weimar (291) reports adjustments, particularly in mathematics. Gould and others (212) give a number of illustrations of adjustments in different subjects. Alltucker (156) discusses what can be done in the secondary school for dull pupils. Adams and Brown (153) discuss ways and means of teaching the bright pupil.

A number of courses of study for bright and dull children have appeared. Among them may be mentioned the new Denver courses in reading and

TABLE 6—AVERAGE MENTAL AGES IN X, Y, AND Z GROUPS, BY GRADES

Grade	Age	Group		
		Z (I. Q. 83)	Y (I. Q. 100)	X (I. Q. 117)
B1.....	6- 6	5- 5	6- 6	7- 7
A1.....	7- 0	5-10	7- 0	8- 2
B2.....	7- 6	6- 3	7- 6	8- 9
A2.....	8- 0	6- 8	8- 0	9- 4
B3.....	8- 6	7- 1	8- 6	9-11
A3.....	9- 0	7- 6	9- 0	10- 6
B4.....	9- 6	7-11	9- 6	11- 2
A4.....	10- 0	8- 4	10- 0	11- 9
B5.....	10- 6	8- 9	10- 6	12- 4
A5.....	11- 0	9- 2	11- 0	12-11
B6.....	11- 6	9- 7	11- 6	13- 6
A6.....	12- 0	10- 0	12- 0	14- 1
B7.....	12- 6	10- 5	12- 6	14- 8
A7.....	13- 0	10-10	13- 0	15- 3
B8.....	13- 6	11- 3	13- 6	15-10
A8.....	14- 0	11- 8	14- 0	16- 5
B9.....	14- 6	12- 1	14- 6	17- 0
A9.....	15- 0	12- 6	15- 0	17- 7

arithmetic for slow-learning (192), and a new Detroit course in literature (272). Also there should be referred to at this point the practice in the courses of study of certain cities of indicating portions to be omitted by average groups and additional portions to be omitted by dull groups. Certain of the Cleveland courses are examples and the Baltimore materials (251:126-44) illustrate a variety of types of differentiation.

A quotation from Dickson (194) expresses well the viewpoint of many advocates of ability grouping.

School administrators will make a very great advance in furnishing equal opportunities for all children when they make it possible for all teachers to be informed that two fundamental practices are to be observed: First, the recognition of differences in ability; and second, the adjustment of method and curriculum content to match such abilities.

*Summary on plans of grouping*—Many different types and degrees of grouping have been used. In some cases little more was done apparently than to group children in supposedly homogeneous sections—as whole classes in a horizontal or vertical organization, as sub-groups within classes, or as sections which differed in different subjects. In other cases standards and rates of progress were varied for the various ability groups. In yet other cases—and this is the practice most generally recommended—the grouping and the adjustment of standards and rate of work are supplemented by considerable differentiation both in content and in method of teaching.

### **Effectiveness of Ability Grouping**

As was previously stated, the crucial questions which must be answered about ability grouping are: Do children in homogeneous groups develop more rapidly and more surely the objectives adopted for the schools than do other children like them in all significant regards except that they are in heterogeneous groups? Does ability grouping secure better results?

First trials of ability grouping were judged very subjectively. In most cases the judgments were favorable, but it must be remembered that it was usually the originator of the plan who judged it, and he was, ordinarily, human and not unbiased.

Later some pseudo-scientific evidence was presented in the form of the differences in achievement between segregated bright pupils and segregated dull pupils. Some investigators concluded from such results that there was great value in ability grouping, overlooking the fact that bright pupils would surpass dull ones whether segregated or not.

Purdum (257: 17-20) says that the first study using the control experiment was conducted by Whipple in 1916 (292). Since that time, between fifteen and twenty control investigations which use objective evidence of progress have been made. A number of others have used as their criterion data on marks, failures, and promotions, or the opinions of various persons—in particular, those of the teachers who used both plans. Attention

should be called to three valuable summaries of the studies of both types: Lincoln in 1929 (234), Miller and Otto in 1930 (245), and Turney in 1931 (280). The earlier references (before 1923) are given in an annotated bibliography by Odell (253).

*Studies based on opinion*—Berry (163:201) reports that 77 percent of Detroit principals noticed no bad effects of X-Y-Z grouping in the first grade the first semester it was tried. He lists the bad effects mentioned by the other 23 percent. Forty-three of the fifty-eight first-grade teachers in Dawson's study (191) gave positive answers in favor of classification on the basis of the Binet test results. Doolittle (198) states that after seven years' trial of homogeneous grouping (based on previous marks) in grades six, seven, and eight, his teachers report many more disadvantages than advantages in the plan. Feingold (202) found that twenty-four of the thirty-three high-school teachers he questioned saw positive advantages in the sectioning of classes. Moyer (249) states that all nine teachers in his experiment were in favor of grouping pupils on the basis of mental tests. Purdom (257) found that all seven teachers in his experiment who replied to his questions favored homogeneous grouping. Rankin (259) reports that 80 percent of the teachers in the Detroit experiment prefer to teach pupils who are homogeneously grouped. Lincoln and Wadleigh (236) asked thirteen questions of Reading, Pennsylvania, teachers in grades one through nine about their reaction to the plan of ability grouping in operation there. The response was generally favorable to ability grouping, except that the teachers were about evenly divided on the question as to whether or not grouping tends to make the bright child egotistical and anti-social. The 500 superintendents of schools who replied to the questionnaire sent out by the Department of Superintendence (251:121) mentioned advantages much more frequently than disadvantages.

*Studies based on marks, failures, and promotions*—Most of the studies of this type, including Dickson (196), Cook (181), Santee (266), Layton (232), Feingold (202), Price (256), Torgerson (279), Lacey (230), Munro (250), and Rainey and Anderson (258) are based on an experimental group only with no control group.

However, in some instances, data are given for assumedly comparable groups before segregation. The data from these studies are in objective form, but changes in percentage promoted or failed or receiving any certain mark are so frequently due to factors quite independent of the real ability of the children that not too much confidence should be placed in the results. It is perhaps significant that every one of the studies which were based on marks or percentages of failures, and where there was no control group, had results favorable to ability grouping. One study utilizing a control group, that of Burt, Chassell, and Hatch (176), also showed some advantage for homogeneous grouping although the data were



not consistent. This study was made at the college level in the field of elementary psychology.

*Studies based on objective tests*—One of the first investigations which used objective tests as the criterion of effectiveness is that of Lowry (238) in 1920. In this study children in grade two were grouped on the basis of mental age and physical age, and progress was judged by gain in score on objective tests of reading. All groups gained in rate of reading, but the significance of the gain is difficult to evaluate because no control group was used. Theisen (276), working similarly with pupils in grade seven, found general superiority for the high groups as compared with the slow groups; but this fact is not a demonstration of the worth of ability grouping because there was no control group. Another study without a control group is that of Dietrich (197), who studied the progress of ability groups in arithmetic and reading, and found that the slow groups gained more than the normal amount.

Moyer (249) arranged three ability groups—plus, medium, and minus—and mixed groups in freshman algebra and Latin in Marquette High School. Plus meant the top third in score on the *National Intelligence Tests*, medium the middle third, and minus the low third. The classes were in progress during the school year 1921-22. Plus pupils in plus classes were compared with plus pupils in mixed classes in score on the *Hotz Algebra Scales* and on the *Henmon Latin Tests*, which were given at the end of the year. Similar comparisons were made for medium and minus classes in algebra but not in Latin. Moyer found that the segregated groups of plus pupils had about the same scores in algebra and slightly higher scores in Latin than did comparable pupils in mixed classes. Medium pupils in segregated groups surpassed medium pupils in mixed groups in algebra, but minus pupils in segregated groups made lower scores than comparable pupils in mixed groups. Moyer adds an interesting item:

Finally, the data suggest that, if pupils are segregated according to ability, those who are accidentally misplaced in higher sections than their ability warrants, may actually profit by this misplacement, but those who are misplaced in lower sections may suffer from such misplacement (249:322).

The chief criticisms of this study are that the segregated and control groups did not have the same teacher, and that no special attention was given to adjusting methods and materials to the segregated groups. No initial tests were used, but that omission is less serious in freshman Latin and algebra than almost anywhere else.

Van Wagenen (284) studied the effects of segregation upon the achievement of very superior pupils in grades seven and eight. These pupils were really higher than usual "X" or bright pupils, for they ranged in I. Q. from 120 to 154. The basis of evaluation was the comparison of their achievement quotients with the achievement quotients of children of like

mental age and with approximately the same I. Q. No appreciable or consistent differences were discovered.

Shields (269) reports an evaluation of ability grouping in reading within the regular classroom group. Four groups were formed on the basis of reading rate and comprehension, one group for each quadrant of a scattergraph in which rate was plotted against comprehension. Each pupil was paired with a pupil of the same chronological age, mental age, and intelligence quotient in an unsegregated group in another school. Reading tests were given at the beginning and end of the six weeks which the experiment lasted. The average gain of the experimental members of the twenty-nine pairs was 42.6 in speed and 3.4 in comprehension, as compared with 27.2 in speed and 1.4 in comprehension for the control members.

Martin (240) compared one section each of superior, average, and slow children taught as homogeneous groups with similar children taught in mixed groups. He found that,

... considering both objective and subjective factors concerning behavior and learning, it is to the advantage of a superior child to be in a homogeneous group with other superior children; to the average child to be in a non-homogeneous group; and to the slow child to be in a homogeneous group.<sup>1</sup>

Purdom's study (257) was an extensive one and will be reported more fully. Ninth-grade pupils taught in English and algebra by nine teachers in five Michigan high schools constituted the subjects. In each school the pupils were divided into two groups, which were equivalent in raw score on the *Terman Group Intelligence Test*. One group was then broken into sections homogeneous with reference to score on the test; the other was broken into an equal number of heterogeneous sections. In the largest school there were five sections or levels of ability; in the two next schools there were three sections; and in the two smaller schools there were two sections, the upper and lower halves of the group.

Each teacher was merely instructed to teach the pupils all she could of her subject, to cover as much course material as possible, to use any method she thought advisable for handling each section, and in every way to feel free to use her own judgment (257:33).

Purdom found that, for the total number of 221 pairs, the experimental group on the average made lower gains on two of the four English tests, on one of the two algebra tests, and lower grades in English but higher grades in algebra. Almost exactly this same statement applies to the bright and dull groups as well. That is, there is no marked difference between the results of homogeneous and heterogeneous grouping under the conditions of the experiment. However, it should be noted that no special effort

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<sup>1</sup> From brief digest in *Bibliography of Research Studies in Education 1926-27*; U. S. Bureau of Education, Bulletin, 1928, No. 22.

was made to adapt the methods and materials of instruction to the different groups.

Purdom does not attempt interpretation of the differences in relation to their unreliability and their magnitude.

Coxe (186) states that if Purdom's cases are matched on his four bases and, in addition, on initial scores in the tests, the conclusions are much more consistently in favor of ability grouping than are Purdom's conclusions.

A large-scale study in Salt Lake City in 1924 is reported by Worlton (299). He states that 2052 pupils, grouped homogeneously on the basis of intelligence tests, were compared with about 1700 pupils who were taught in heterogeneous groups. All were in grades IV, V, VI, or VII. At the beginning and end of the semester the following tests were administered to both groups: *Thorndike-McCall Reading Scale*, *Morrison-McCall Spelling Scale*, and *Salt Lake City Mixed Fundamentals*. Worlton does not present in this article (299) his numerical data. His conclusions, based on the test results and on the opinions of teachers, are as follows:

1. Pupils classified with respect to general ability tend to be classified with respect to ability in reading and spelling.
2. Classes which are made homogeneous with respect to general ability tend to improve their homogeneity with respect to subjectmatter more than do heterogeneous classes.
3. Pupils in homogeneous classes make greater gains in knowledge of the subjects taught than do pupils in heterogeneous classes.
4. In general, pupils are in a more wholesome educational environment when they are taught in homogeneous groups (299:267).

Worlton (298) reports a second study dealing with bright pupils in 1927. After sorting by intelligence level (expressed as the sigma index score where 100 is the mean for the age group and where 20 points are equivalent to one sigma) he compares 714 pupils in homogeneous classes with 426 pupils in heterogeneous classes chiefly in small schools, with 326 pupils in heterogeneous classes in one large school which had never adopted ability grouping, and with 766 pupils in heterogeneous classes in 1924. The factor of the teacher was assumed to be equal in the various groups. The same educational tests were used as in 1924. The results of the tests used were expressed as sigma index scores and averaged for each pupil.

Table 7 presents the essential data. With but one exception the means for the homogeneous groups are higher than the means for any of the three types of heterogeneous control groups. Pupils in homogeneous groups excelled those in mixed groups in practically all levels of ability which were studied. This result is the more significant since the lowest levels were not included in the experiment. Worlton also emphasizes the fact that the dispersions of scores were less in homogeneous groups than in the

TABLE 7—NUMBER OF PUPILS, MEAN ACHIEVEMENT SCORES, AND STANDARD DEVIATIONS FOR PUPILS OF VARIOUS INTELLIGENCE LEVELS TAUGHT IN HOMOGENEOUS CLASSES, IN HETEROGENEOUS CLASSES, AND IN SCHOOL X AND COMPARABLE SALT LAKE CITY SCORES FOR JANUARY, 1924\*

Intelligence group	Homogeneous classes			Heterogeneous classes			School X			Salt Lake City, January, 1924	
	Number of pupils	Mean	Standard deviation	Number of pupils	Mean	Standard deviation	Number of pupils	Mean	Standard deviation	Number of pupils	Mean
90-99 .....	94	111.97	10.05	78	108.84	10.36	57	106.15	8.93	200	97.4
100-109 .....	151	114.59	10.42	124	113.72	11.14	103	109.32	9.75	250	103.7
110-119 .....	191	118.14	9.80	101	116.69	11.96	71	114.12	10.40	176	111.0
120-129 .....	107	122.51	9.55	56	118.66	12.75	33	117.53	9.27	82	116.0
130-139 .....	103	121.79	8.34	41	121.62	10.84	36	121.94	8.51	34	119.4
140 and above....	68	126.97	9.40	26	124.46	9.23	26	122.88	10.25	24	114.4
Total.....	714	.....	.....	426	.....	.....	326	.....	.....	766	.....
Composite.....	.....	118.53	9.68	.....	115.40	11.26	.....	113.12	9.60	.....	105.61

\* Adapted from Table II of Worlton (298).

heterogeneous groups in small schools in five of the six possible comparisons. Worlton concludes:

1. The great majority of pupils in the grammar grades—those scoring 90 and above in native ability—are achieving significantly better scholastic results in the subjects tested than were corresponding pupils in January, 1924. This improvement is probably a result of the improved classification of pupils and the more effective methods of teaching accompanying the better classification. These methods and the supporting psychology of individual differences have spread with beneficial results to all the schools in the city.
2. Homogeneous classification of pupils offers superior advantages over heterogeneous classification for the scholastic achievement of pupils of normal ability and of more than normal ability.
3. The improvement made since January, 1924, in the scholarship of pupils of high native ability indicates that, with proper classification and instruction, these pupils may be expected to achieve scholastic results commensurate with their abilities.
4. Measures of the distribution of scores around the means show that the percentage of pupils achieving scholastic results commensurate with their abilities is larger when the pupils are taught in homogeneous classes than when they are taught in heterogeneous classes (298:345).

Billett<sup>1</sup> (164) studied ability grouping in English in three successive groups of ninth-grade children in the Harvey High School of Painesville, Ohio, during the years 1924-27. Each year a fast homogeneous group, an average homogeneous group, and a slow homogeneous group were compared with two heterogeneous groups as controls. The first and third years the sectioning was done on the basis of intelligence quotients from the *Terman Group Test of Mental Ability*. A combination of the intelligence quotient and teachers' rating was used as the basis during the second year.

The only differentiation in the course for the different groups apparently was that the fast and average groups covered additional material beyond the regular course.

During each of the three years all five classes of pupils in this experiment were taught by the same teacher in the same classroom, hence the factor of the teacher was equalized. Each year educational tests were given at the beginning and end of the year. The first year the following tests were used: *Briggs English Form Test*, *Charters Language Test*, *Charters Grammar Test*, *Inglis Vocabulary Test*, and *Hudelson Composition Scale*.

During the second and third years were added also the *Lewis Letter of Application*; *Haggerty Reading Examination*, *Sigma 3*; *Abbott-Trabue Appreciation of Poetry*; and *Kirby Grammar Test—Sentences and Principles*.

The mean gain in each test each year was obtained separately for homogeneous and heterogeneous groups of slow, average, and fast pupils. The difference in mean gains was then interpreted by expression as the critical

<sup>1</sup> Billett also has conducted four additional controlled experiments in this field which have not yet been published.



TABLE 8—COMPARISONS OF THE MEAN GAINS OF PUPILS IN HOMOGENEOUS AND HETEROGENEOUS GROUPS<sup>1</sup>

Tests	1924-25				1925-26				1926-27			
	Mean gain		Differences in mean gains <sup>2</sup>	Critical ratio	Mean gain		Differences in mean gains	Critical ratio	Mean gain		Differences in mean gains	Critical ratio
	Homo- geneous	Hetero- geneous			Homo- geneous	Hetero- geneous			Homo- geneous	Hetero- geneous		
Briggs English Forms Test:												
Slow	3.27	3.20	.07	0.6	.85	1.37	-.52	-0.5	.04	-.76	-.80	1.0
Average	2.57	2.15	.42	0.3	.61	.59	-.02	.05	.88	.92	-1.80	-2.5
Fast	2.23	2.34	-.11	-0.2	1.16	2.00	-.84	-1.0	1.41	2.74	-1.33	-2.2
Charters Language Test:												
Slow	3.46	3.27	.19	0.1	4.07	-.12	4.19	2.3	1.35	-1.12	2.47	2.4
Average	4.09	5.00	-.91	-0.6	4.26	4.06	-.20	0.2	1.80	1.88	-.08	-0.1
Fast	2.86	3.39	-.53	-0.5	2.56	3.56	-1.00	-1.1	2.66	2.53	.13	0.2
Charters Grammar Test:												
Slow	3.87	4.27	-.40	-0.2	7.07	.38	6.69	4.6	3.00	-.64	3.64	2.6
Average	7.95	6.28	1.67	0.8	4.13	4.64	-.51	-0.3	4.21	4.64	-.43	0.3
Fast	7.36	7.48	-.12	-0.1	4.92	4.63	.29	0.2	4.62	5.69	-1.07	-1.1
Ingis Vocabulary Test:												
Slow	6.07	5.67	.40	0.1	6.92	6.37	.55	0.2	.13	2.53	-2.40	-0.8
Average	2.95	4.00	-1.05	-0.3	3.00	5.59	-2.59	-0.9	8.08	5.50	2.58	1.0
Fast	11.60	8.76	2.84	0.9	6.28	2.31	3.97	1.1	5.52	9.00	-3.48	-0.9
Hudelson Composition Scale:												
Slow	1.66	.39	1.27	6.0	.69	.99	-.30	-1.1	1.67	1.13	.54	3.2
Average	1.41	.41	1.00	3.3	.28	1.01	-.73	-2.7	1.88	1.33	.55	3.2
Fast	.82	.92	-.10	-0.3	-.65	1.25	-1.90	-7.1	1.27	1.38	-.11	-0.5
Lewis Letter of Application:												
Slow	.....	.....	.....	.....	26.92	11.25	15.67	7.7	2.78	1.41	1.37	0.8
Average	.....	.....	.....	.....	6.00	7.94	-1.94	-3.4	2.04	2.87	-.83	-0.8
Fast	.....	.....	.....	.....	12.80	9.07	3.73	1.8	6.17	2.52	3.65	2.0
Haggerty Reading Examination Sigma 3:												
Slow	.....	.....	.....	.....	.77	.75	1.52	0.3	3.31	-3.47	6.78	2.0
Average	.....	.....	.....	.....	3.74	1.59	2.15	0.6	5.92	7.67	-1.75	-0.6
Fast	.....	.....	.....	.....	-.20	2.56	-2.76	-1.0	-2.62	7.26	-9.88	-3.8
Abbott-Trabue Appreciation of Poetry:												
Slow	.....	.....	.....	.....	-.15	.87	-1.02	-2.4	.82	.05	.77	2.2
Average	.....	.....	.....	.....	.82	.18	1.00	2.7	1.34	.92	1.42	-1.6
Fast	.....	.....	.....	.....	.92	.50	.42	1.1	1.86	.16	1.70	4.8
Kirby Grammar Test (Sentences):												
Slow	.....	.....	.....	.....	3.23	1.62	1.61	1.2	.96	-.23	1.19	1.1
Average	.....	.....	.....	.....	-1.22	.35	-1.57	-1.7	.32	-.46	.78	1.3
Fast	.....	.....	.....	.....	.84	1.50	-.66	-1.1	-.41	.32	-.73	-1.1
Kirby Grammar Test (Principles):												
Slow	.....	.....	.....	.....	1.84	.38	1.46	0.8	5.01	2.47	3.44	2.1
Average	.....	.....	.....	.....	3.43	2.58	.85	0.8	3.56	2.19	1.37	2.7
Fast	.....	.....	.....	.....	4.80	5.75	-.95	-0.7	3.93	6.21	-2.28	-2.1

<sup>1</sup> Rearranged from Billett's data in his Tables III, VI, and X with corrections by him.

<sup>2</sup> When the gain of the heterogeneous group is greater than the corresponding gain of the homogeneous group it is preceded by a minus sign.

ratio (defined as the ratio of the difference to its probable error) and as the ratio of the difference to the standard deviation of the test scores. Table 8 gives the actual gains, the difference, and the critical ratio for each comparison. Table 9 shows, for all the tests used, the average superiority in standard-deviation units of homogeneous over heterogeneous grouping.

Homogeneous grouping as compared with heterogeneous grouping appears to be somewhat superior for slow children, slightly superior for average children, and slightly inferior for able children. The author attributed the results of the second year with average and fast children to the fact that the sectioning was based in part upon teachers' marks. For this reason the basis was changed the third year to intelligence quotient alone.

Billett's general conclusions were as follows:

1. Teachers' ratings or teachers' marks should never be used *in toto* or in part as a basis for homogeneous grouping for the purpose of promoting the educational development of pupils, because such ratings or marks are largely measures of qualities which education seeks to change.
2. Homogeneous grouping for the purposes of education should be based on traits not subject to change through education, such as the intelligence quotient, the probable learning rate, or the index of brightness.
3. Grouping on the basis of the intelligence quotient has shown a marked measurable advantage for slow pupils, some measurable advantage for average pupils, and a slight measurable disadvantage for bright pupils.
4. The slight measurable loss to bright pupils because of homogeneous grouping is far outweighed by the measurable advantages which seem to affect the records of the slow and average pupils (164:194).

Rankin (259) reports an investigation of ability grouping in Detroit in 1927. Approximately 1100 pupils in 36 classes in grade 7B in six intermediate (junior high) schools were involved. There were nine units of four classes each in the experiment, three schools having two such units and three schools having one unit. At the beginning of the term each unit of approximately 140 pupils was divided into three groups of 46 or 47 pupils—a high group, an average group, and a low group. This section-

TABLE 9—AVERAGE SUPERIORITY FOR ALL TESTS IN STANDARD-DEVIATION UNITS OF HOMOGENEOUS GROUPING OVER HETEROGENEOUS GROUPING\*

Ability	1924-25	1925-26	1926-27
Slow.....	.158	.279	.328
Average.....	.148	-.088	.018
Fast.....	-.008	-.091	-.038

\* Adapted from Billett (164).

ing was done on the basis of chronological age, intelligence test rating, and teacher estimate. Eleven or twelve pupils were then taken from each of these three groups and placed together in a mixed section.

Each unit, which then included a high group, an average group, a low group, and a mixed group, was taught in arithmetic by one teacher, in English by another teacher, in general science by a third teacher, and in social science by a fourth teacher. However, all four classes in each unit had the same teacher in any particular subject. The only exception was in general science in one school where three different teachers taught the four sections.

The majority of the teachers who taught the homogeneous sections had had experience for several years in working with children segregated in X, Y, and Z groups. They were encouraged to make adjustments in method, content, and standards to the abilities and needs of their various groups.

The high pupils who were in homogeneous sections had substantially the same mean age and intelligence quotient, based on the *Detroit Alpha Intelligence Test* (Table 10) as the high pupils in mixed sections. A similar statement may be made regarding the average and the low pupils.

All the pupils were given seven educational tests at the beginning of the semester and seven equivalent forms of these tests at the end. These tests included one reading test, one spelling test, two English tests, one social science test, and two arithmetic tests. The mean gain of each group, the superiority of gain in homogeneous group over gain in mixed group, and the ratio of this superiority to the standard deviation of the superiority were computed and recorded in Table 11. On the whole, there is a small advantage with homogeneous grouping.

Low and average groups both gain more when in homogeneous sections, but high groups gain more in mixed groups. No consistent differences appear in the effects by subjects.

TABLE 10—MEAN CHRONOLOGICAL AGE AND MEAN INTELLIGENCE QUOTIENT OF HIGH, AVERAGE, AND LOW GROUPS IN HOMOGENEOUS AND MIXED SECTIONS\*

Group	Number of cases		Mean age		Mean intelligence quotient	
	Homo- geneous	Mixed	Homo- geneous	Mixed	Homo- geneous	Mixed
High.....	261	86	12.13	12.18	111	114
Average.....	254	85	12.68	12.88	102	101
Low.....	215	62	13.45	13.65	91	88

\* Adapted from Rankin (259).

Dvorak and Rae (200) compared, at the end of the year, the achievement of a segregated group of 27 first-grade children with that of an equivalent group taught in mixed sections. The segregated group, as compared with the unsegregated group, made higher scores on the *Gray Oral Reading Check Test* and on the *Pressey Second-Grade Attainment Scale in Reading*, but lower scores on two tests from the *Iowa Spelling Scale* and the *Buckingham Extension of the Ayres Spelling Scale*. The authors explain this difference as due to the fact that considerable adaptation of mate-

TABLE 11—COMPARISONS OF THE GAINS IN STANDARDIZED TESTS IN TERMS OF THE MEAN GAINS OF PUPILS IN HOMOGENEOUS WITH THOSE IN MIXED GROUPS\*

	Mean gain homo- geneous group	Mean gain mixed group	Superiority homo- geneous over mixed	Ratio of superiority to Standard deviation of difference
Detroit Reading Test 4:				
High.....	1.80	1.50	.30	.73
Average.....	2.42	1.52	.90	2.14
Low.....	1.90	1.64	.26	.50
Spelling Test:				
High.....	3.86	4.04	— .18	— .34
Average.....	5.88	5.24	.64	1.10
Low.....	7.56	6.92	.64	.91
Capitalization and Punctuation:				
High.....	9.34	8.38	.96	1.00
Average.....	9.82	9.07	.75	.75
Low.....	12.70	9.31	3.39	2.63
Grammatical Forms:				
High.....	.12	1.02	— .90	— 2.14
Average.....	.90	.46	.44	.86
Low.....	1.48	1.96	— .48	— .72
7B Social Science:				
High.....	8.59	7.75	.84	.94
Average.....	8.80	9.58	— .78	— .81
Low.....	7.45	8.62	— 1.17	— 1.08
Mixed Fundamentals:				
High.....	2.76	3.08	— .32	— .82
Average.....	3.68	2.92	.76	.20
Low.....	3.32	3.24	.08	.19
7B Mathematics:				
High.....	4.98	5.64	— .66	— 1.22
Average.....	3.72	5.04	— 1.32	— 2.80
Low.....	4.22	4.16	.06	.10
Average of all tests:				
High.....				— .26
Average.....				.47
Low.....				.36
Total.....				.17

\* Adapted from Rankin (259).

rials and methods was made for the segregated group in reading but practically none in spelling except a decrease in drill. They conclude:

Where the methods and the materials of instruction are adapted to the ability of the pupils, as is possible in a segregated group, greater achievement is the result. Where the methods and the materials are not adapted to the ability of the pupils, no greater results are achieved merely because of homogeneous grouping (200:385).

Bonar (167) compared the achievements of three first-grade classes, one represented the upper third of the group, one represented the entire group, and one represented the lower half of the group. A number of different tests were used but only gross comparisons from group to group were made. No effort was made to compare achievements of pupils of a certain ability level in a homogeneous group with those of similar pupils in a mixed group.

Boyer (169) describes the development of the Philadelphia experiment in homogeneous grouping. Since 1926, five elementary schools have been used as experimental centers for the trial and appraisal of various procedures in ability grouping. No formal controlled experiment has yet been conducted though one is now in progress (1930-31). The only evidence yet available as to effectiveness is the comparison of progress in the five schools with progress generally in the city. In this connection, Boyer says,

. . . during a period of a school year, pupils in the ability grouped schools made greater gains in achievement as recorded in the results of standardized tests than the gains achieved by pupils in the entire school system. However, detailed examination of the tabular statement discloses several inconsistencies which seem to be the results of incidental circumstances such as good or poor teaching, relatively high or low average intelligence levels of the groups concerned, or generally favorable or unfavorable environments for pupils in given grades of particular schools (169:248).

Holy and Sutton (221) present a preliminary report on an experiment conducted in the Central Junior High School of Marion, Ohio, by the Bureau of Educational Research of Ohio State University.

One hundred forty-eight pupils in the second semester of ninth-grade algebra were divided into six groups in terms of the scores obtained on the *Otis Group Intelligence Scale*: fast, average, and slow groups of like intelligence quotients, and three similar groups arranged with no attempt at homogeneity. . . . These pupils were all taught by the same teacher . . . (221:419).

At the beginning and end of the semester all six classes took corresponding forms of the *Hotz Algebra Scale, Series A*; the *Douglass Standard Diagnostic Test for Elementary Algebra, Test I*; and all four forms of the *Illinois Standardized Algebra Test*. Pupils in the homogeneous and heterogeneous groups were paired in I. Q. to within five points and in initial scores on the Hotz test to within one point. Forty-eight pairs were thus secured. The mean initial scores were closely the same for the forty-eight homogeneously grouped pupils and for the 48 heterogeneously grouped pupils, not only in the Hotz test but also in the Douglass and Illinois tests.



Table 12 shows the mean gains from initial to final test, together with the difference in gain and the standard error of the difference. The authors stated:

All of the gains are in the same direction, in favor of the homogeneous group, although only one of them is highly significant. One seems justified in concluding, therefore, that there is a noticeable difference toward homogeneous grouping, but whether it is equivalent to one, two, three, or more weeks of instruction would require tests of greater exactness of measurement than these used (221:422).

*Studies based on miscellaneous measures*—A variety of approaches have been used to the problem of the evaluation of ability grouping as a device in school organization. Turney (280:26) lists (but does not contend that all are valid) seven criteria as having been used at one time or another in appraising the effectiveness of ability grouping.

1. The comparative achievement of pupils of equal ability in homogeneous and heterogeneous sections
2. The effect upon failure and elimination
3. The mental hygiene or happiness of the pupil
4. The motivation of the pupil
5. The ease of teaching and teachers' attitudes toward ability grouping
6. The comparative achievement of classes of different ability
7. The amount of shifting following ability grouping

Turney reviews the relevant studies under each of these headings.

Burr (175) studied the amount of overlapping of educational achievement in homogeneous groups in six cities which use some plan of ability

TABLE 12—AVERAGE GAINS IN FINAL SCORES OVER INITIAL SCORES FOR THE PAIRED MEMBERS OF EACH GROUP\*

	Mean gain	SD of mean gains	Difference of gain $H_o - H_c$	Standard error of difference
Hotz:				
Homogeneous.....	7.58	5.44	.80	1.10
Heterogeneous.....	6.78	5.34	.....	.....
Douglass:				
Homogeneous.....	7.31	4.18	4.12	.98
Heterogeneous.....	3.19	5.36	.....	.....
Illinois:				
Homogeneous.....	20.62	10.45	.62	2.22
Heterogeneous.....	20.00	11.30	.....	.....

\* Adapted from Table III of Holy and Sutton (221:422).

grouping. A variety of bases of grouping were used in these cities. The author states that the twenty-five charts presented indicate

. . . that the "homogeneous" groups in these six field situations overlap markedly in their achievement (as measured by standard tests) in subjects such as reading and arithmetic (175:26).

Further, Burr studied the percent which the range within individual homogeneous sections is of the total range of grade achievement on standard educational tests and found that this percentage varied from an average in one city of 68 percent to an average in another city of 85 percent. The average in all six cities was 78 percent.

Burr also regrouped the children in several sections according to scores in a single subject and investigated the overlapping in other subjects. He concludes:

. . . that groups in these field situations, as they are taught at the present time, are not homogeneous and there is no way of forming homogeneous groups except with respect to one subject at a time, and even then the groups will not be entirely homogeneous in the different phases of that one subject (175:41).

Goodrich (210) analyzed the replies of over 400 superintendents, principals, and teachers to a questionnaire request for opinion on homogeneous grouping and its influence on the personality of pupils. In general the response favored homogeneous grouping, particularly if curriculum and methods were modified, and if the grouping was done on a multiple rather than a single basis. Under homogeneous grouping teachers were believed to be more likely to have sympathy for slow pupils, to study individual needs, and to have respect for the personality of pupils than under heterogeneous grouping. Similarly slow pupils were believed to be less likely to be discouraged, to develop habits of idleness or anti-social attitudes, and so forth. There was more difference of opinion as to the effect upon bright pupils, particularly in characteristics such as the development of anti-social attitudes, snobbishness, and contempt for slow pupils.

*Summary on effectiveness of ability grouping*—Miller and Otto, after reviewing twenty studies in the field, conclude that:

. . . so far as achievement is concerned, there is no clear-cut evidence that homogeneous grouping is either advantageous or disadvantageous. The studies seem to indicate that homogeneous classification may be effective if accompanied by proper adaptation in methods and materials (245:101).

Turney, on the basis of his recent survey of the field, summarizes, in part, as follows:

1. Experimental literature indicates that more often than not pupils do better in homogeneous groups than in heterogeneous groups.
2. There is a fairly strong indication that when efforts are made to adapt the means and materials of instruction to the needs of different levels of ability, better achievement occurs in homogeneous than in heterogeneous groups.

3. In the experimental situation where there is no special effort made to adapt content or method the average and lower groups appeared to benefit more often than the higher groups (280:123).

In terms of the data presented in this section, it may be concluded:

1. That the evidence slightly favors homogeneous grouping, as contrasted with heterogeneous grouping, particularly where adaptations of standards, materials, and methods are made.
2. That the evidence regarding the attitude of teachers toward homogeneous grouping is that most teachers prefer to work with homogeneous groups rather than with mixed groups.
3. That the evidence regarding the relative merits of various bases of grouping is conflicting and inconclusive.
4. That the evidence regarding the relative merits of various types of adaptation of standards, materials, and methods is inadequate to form a judgment.
5. That the evidence indicates greatest relative effectiveness for dull children, next greatest for average children, and least (frequently harmful) for bright children.
6. That the evidence regarding the particular grade levels or subjects in which homogeneous grouping is particularly effective is inadequate to form a judgment.
7. That the evidence regarding the effect of homogeneous grouping upon characteristics of pupils other than knowledges and skills is highly subjective and cannot be said to be conclusive.

### Individualized Instruction

As has been suggested above, a group with a membership of only one pupil constitutes the only perfectly homogeneous plan of grouping which is possible. Some form of individualization of mass instruction seems, therefore, to be the logical limit of any scheme of grouping. True individualization has been defined as "complete adjustment through provision of self-instructional and self-corrective materials, with individual standards and schemes of administration which make it possible to handle a large group of children in such a manner that each child can take what is for him the next step in development at the time when he needs it, can work at its mastery in his own way, can progress at his own rate, in his own time, and for his own purposes."

Part II of the Twenty-fourth Yearbook of the National Society for the Study of Education, *Adapting the Schools to Individual Differences* (252), contains the most comprehensive account of the wide variety of ways and means of carrying on programs of individualization. Here and elsewhere are described coaching, the case study approach, the Winnetka plan, the Morrison mastery plan, the Dalton plan, the activity curriculum, the Cour-

tis integrated plan, and others. They are alike in being procedures to meet more or less completely the ideal of complete adjustment to the *individual* differences, as contrasted with *group* differences to which plans of ability grouping seek to adjust. Billett (165), in a report of some preliminary findings of the National Survey of Secondary Education, lists a large number of adjustments which are now being made in American high schools. The variety and frequency mentioned seem very large.

Few efforts at adequate appraisal of plans of individualization have been made. The Twenty-fourth Yearbook, Part II (252:133-222) reports several inadequate attempts. Washburne, Vogel, and Gray (290) describe their evaluation of the Winnetka procedure. Rankin (260) and Vreeland (287) give accounts of an ambitious large-scale experiment being conducted in Detroit on the relative effectiveness of various types and degrees of individualization, but final results are not yet available.

Obviously any final appraisal of ability grouping will include comparisons not only with heterogeneous grouping, but also with other possible instructional and administrative organizations such as different plans of individualization.

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